STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

Bulletin No. 68

RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES

PROGRESS REPORT
JULY 1, 1953-JUNE 30, 1955

GOODWIN J. KNIGHT
Governor

HARVEY O. BANKS
Director of Water Resources

January, 1958

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Typical sewage treatment plant constructed and placed in operation during 1953-1955

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STATE OF CALIFORNIA

Department of Water Resources

SACRAMENTO

January 27, 1958

Honorable Goodwin J. Knight, Governor,
and Members of the Legislature of
the State of California

Water Pollution Control Boards

Gentlemen:

I have the honor to transmit herewith the third progress report to the Governor, Legislature, and the several water pollution control boards on "Reclamation of Water from Sewage or Industrial Waste," as authorized and directed by Section 230 of the Water Code.

This report presents a statewide inventory of sewage treatment facilities discharging to tidewaters, and status of sewage reclamation projects for the two-year period July 1, 1953 through June 30, 1955.

Investigation of the feasibility and practicability of reclamation of waste waters, under Section 230 of the Water Code, is an integral part of the study and planning activities of this Department in support of the California Water Development Program.

Very truly yours,

Harvey O. Banks

HARVEY O. BANKS
Director

ORGANIZATION
STATE DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

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NOTE: Prior to establishment of the Department of Water Resources on July 5, 1956, the following organizational positions were in effect under the Division of Water Resources:

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ACKNOWLEDGMENT

The valuable assistance and cooperation given by many individuals, public agencies and private organizations in the preparation of this report is gratefully acknowledged. Particular recognition is due the following, who provided technical assistance and important data:

State Water Pollution Control Board

Regional Water Pollution Control Boards

State Department of Public Health, Bureau of Sanitary Engineering and Division of Laboratories

City and County of San Francisco

City of Los Angeles

City of San Diego

Sanitation Districts of Los Angeles County

Los Angeles County Flood Control District

Orange County Sanitation Districts

East Bay Municipal Utility District

University of Southern California

The collection of a large portion of sewage effluent samples for mineral and sanitary analyses reported herein was made possible through interest and assistance from the staffs of many sewage treatment plants. The competent help of these individuals is greatly appreciated.

Many of the analyses reported herein were performed by the United States Geological Survey, Quality of Water Branch, under cooperative agreement with the Department of Water Resources.

Many of the analyses reported for southern California were performed by the State Department of Public Health, Division of Laboratories.

CHAPTER I. INTRODUCTION

This is the third of a series of reports pertaining to reclamation of water from sewage or industrial wastes in California, and covers the period from July 1, 1953, to June 30, 1955. This report presents basic data on quantity and quality of waste discharges and pertinent information regarding development of sewage treatment facilities and status of reclamation projects.

Authorization

The State Department of Water Resources is authorized by Section 230 of the Water Code to conduct investigations pertaining to reclamation of water from sewage or industrial wastes. Chapter 1552, Statutes of 1949 added Section 230 to the Water Code, which reads:

> "230. The Department, either independently or in cooperation with any person or any county, state, federal, or other agency, to the extent funds are allocated therefor, shall conduct surveys and investigations relating to the reclamation of water from sewage or industrial wastes for beneficial purposes, including but not limited to the determination of quantities of such water presently wasted, and possibilities of use of such water for recharge of underground storage or for agricultural or industrial uses; and shall report to the Legislature and to the appropriate regional water pollution control board thereon, annually."

Prior Investigations and Reports

In December 1952, the Division of Water Resources submitted to the Legislature and to the regional water pollution control boards the first progress report on "Reclamation of Water from Sewage or Industrial Wastes", for the period May 1951, through June 1952. This report presented fundamental considerations and preliminary data on status of waste water reclamation, utilization of reclaimed water for beneficial purposes and statistics on

quantity and quality of wastes discharged to the Pacific Ocean and tidal waters.

The second progress report, submitted in June 1954, continued the inventory for the period July 1, 1952, through June 30, 1953, and summarized changes in sewered areas and in sewage treatment facilities. It also discussed progress of studies on sewage reclamation projects by the Division of Water Resources and other public agencies.

The following publications, in addition to previously mentioned progress reports dealing with the reclamation of water from sewage and industrial wastes, were reviewed and abstracted during the preparation of the present report.

1. Caldwell, D. H., Hyde, C. G., and Rawn, A. M. "Report on Collection, Treatment and Disposal of the Sewage of San Diego County, California". September 1952.

2. California State Department of Public Works, Division of Water Resources. "Feasibility of Reclamation of Water from Sewage in International Outfall Sewer, Tia Juana Valley, San Diego County". Unpublished Report.

3. California State Water Pollution Control Board. "A Survey of Direct Utilization of Waste Waters." Publication No. 12. 1955.

4. Rawn, A. M., Bowerman, F. R., and Stone, Ralph. "Integrating Reclamation and Disposal of Waste Water." Journal American Water Works Association. May 1953.

5. University of Southern California, Engineering Center. "Waste Water Reclamation and Utilization." Monthly Progress Report No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, No. 7, No. 8, and No. 9. 1955.

Status of Current Investigations

As of June 30, 1955, the Division of Water Resources was conducting investigations and preparing several reports pertaining to the reclamation of water.

Feasibility of Reclamation of Water from Sewage at International Outfall Sewer, Tia Juana Valley, San Diego County

The scope of this investigation was outlined in the second progress report. During the reporting period, field and office work on this investigation was completed, and a draft of the report was under preparation. Results of the investigation were to be reproduced as an office report.

Water Quality and Water Quality Problems, Ventura County

As a part of this investigation, a study was made of the feasibility of reclamation of sewage at Oxnard. The scope of that investigation was outlined in the second progress report. During the period of this study, the study of the feasibility of reclamation of water from sewage at the City of Oxnard was completed. The results of that study indicate that water reclaimed for irrigation purposes would cost about $23 initially, and reduce to about $15 per acre-foot in a 20-year development program. These costs include polishing treatment and distribution.

Feasibility of Reclamation of Water from Sewage, Los Angeles Metropolitan Area

The largest waste discharges to the ocean occur in the Los Angeles Metropolitan Area where more than 500,000 acre-feet of waste waters are discharged annually. The principal sewerage systems include the City of Los Angeles, the Sanitation Districts of Los Angeles County, and the Orange County Sanitation Districts. Rapid growth in population and industry in this large metropolitan area has greatly increased water requirements to the point that the local ground water basins have been seriously depleted, and sea-water intrusion has taken place in the coastal area. With the urbanization and industrialization of the area, the volume of waste waters being discharged to the ocean has greatly increased. It is reasonable, therefore, to examine

these waste discharges as a possible source of supply for the replenishment of overdrawn ground water basins and possible utilization for industrial purposes.

Scope of Investigation. This investigation includes study and evaluation of the following items:

1. The amount of water which could be reclaimed from sewage presently discharged by the three major systems in the metropolitan area.

2. Survey of the mineral quality of sewage at the principal treatment plants and major trunks of the three principal sewerage systems.

3. Survey of potential sites for plants to reclaim water from sewage.

4. Preliminary surveys of potential markets for reclaimed water.

5. Preliminary estimates of cost of reclaiming water from sewage and cost of conveyance to place of use.

Progress of Investigation. As of June 30, 1955, the field surveys and quality surveys have been completed for the City of Los Angeles system and the Orange County Sanitation Districts. Work was initiated on the preparation of maps showing principal trunk sewers and sewered areas in the metropolitan area. Contacts were made with the city and county agencies to secure information on present sewage flows and anticipated future expansion of their sewerage system.

Reclamation of Water from Sewage and Industrial Wastes, San Jose Area, Santa Clara County

This investigation was outlined in the second progress report. Shortly thereafter, the Bay Barrier Investigation was started. Both this and the fact that San Jose was planning construction of a sewage treatment plant were expected to alter the position of waste reclamation. Consequently, this investigation was postponed.

Objective and Scope

This report presents an inventory of reclamation projects and waste treatment facilities for the period July 1, 1953, through June 30, 1955, and evaluates the quality and quantity of water being wasted. These waste waters are viewed as potential sources of additional supply and where reclamation of these waters appears feasible, these data can serve as a basis for more detailed study.

Waste discharges reported herein are confined to facilities discharing more than one million gallons per day to tidewaters, except for the San Francisco Bay Area, where one-half million gallons per day was used as the lower limit. Cooling water returns are not included. The data are presented by water pollution control regions. Of the nine regions in the State, the Lahontan and the Colorado River Basin are inland regions without access to tidewaters, and one, the North Coastal Region, does not contain any single discharge exceeding the above limits. The data in this report, therefore, are confined to the Central Valley Region, the San Francisco Bay Region, the Central Coastal Region, the Los Angeles Region, the Santa Ana Region, and the San Diego Region.

The data include present sewerage facilities, recorded flows for these facilities, and mineral and sanitary characteristics of these waste discharges. Descriptions of waste water reclamation projects, existing and proposed, are also included.

Field Investigation

The field program to obtain pertinent data for the preparation of this report comprised the following:

1. Interviews with waste discharging agencies to obtain flow records, changes in facilities and reclamation practices.

2. Collection of hourly waste water samples over eight hour, sixteen hour, twenty-four hour or weekly periods for quality determinations, dependent upon local conditions. The samples were generally composited by flow to obtain an analysis more nearly indicative of the average quality of the discharge. When composite samples could not be obtained, single grab samples were substituted.

3. Field analyses were made on individual hourly samples to determine pH, temperature, and electrical conductivity. Hourly flows were also recorded.

Laboratory Methods and Procedures

Composited samples were analyzed for sanitary and mineral quality, in accordance with the current edition of "Standard Methods for the Examination of Water, Sewage, and Industrial Wastes". Sanitary analysis included determination of five-day 20°C biochemical oxygen demand, suspended solids, most probable number of coliform organisms, and ether soluble material. Mineral analysis consisted of determination of electrical conductivity, pH, calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulfate, chloride, nitrate, fluoride, boron, silica, total dissolved solids, and hardness.

Sanitary analyses were performed by the Department's mobile laboratory in northern California and permanent laboratory facilities in southern California. Mineral analyses were performed by the United States Geological Survey in Sacramento, the Department's laboratory in southern California, and by the State Department of Public Health, Division of Laboratories.

Water Quality Requirements

Water quality requirements for industrial use are extremely varied. Requirements for irrigation uses fall into two classes: mineral and sanitary.

Criteria for mineral quality of irrigation water used by the Department of Water Resources are those developed at the University of California at Davis and at the Rubidoux and Regional Salinity Laboratories of the United States Department of Agriculture.* Because of the diverse climatological conditions, and the variation in crops and soils in California, only general limits of quality for irrigation waters can be suggested. The following broad classifications of irrigation waters are used by the Department:

Class I - EXCELLENT TO GOOD: Regarded as safe and suitable for most plants under any condition of soil and climate.

Class II - GOOD TO INJURIOUS: Regarded as possibly harmful for certain crops under certain soil conditions.

Class III - INJURIOUS TO UNSATISFACTORY: Regarded as probably harmful to most crops and unsatisfactory for all but the most tolerant.

The sanitary regulations governing the use of sewage to irrigate crops are given in Bulletin No. 59 of the State Department of Public Health. These regulations provide that: (1) untreated sewage shall not be used to irrigate growing crops, screening and grit removal not being considered as treatment; (2) settled sewage or partially disinfected effluents shall not be used to irrigate certain specified types of growing crops; and (3) no restrictions apply against the use of a well oxidized, reliably disinfected effluent where the treatment works have adequate safety factors to insure the production of an effluent always meeting certain specified bacteriological standards.

Definitions

The following terms are used as defined in connection with the discussion of water reclamation from waste waters in this report:

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* L. V. Wilcox and O. C. Magistad, "Interpretation of Analyses of Irrigation Waters and the Relative Tolerance of Crop Plants", U. S. Regional Salinity Laboratory, 1943.

Sewage. "Any and all waste substance, liquid or solid, associated with human habitation, or which contains or may be contaminated with human or animal excreta or excrement, offal, or any feculent matter."* As used in this report, sewage includes all liquid wastes carried by community sewer systems.

Industrial waste. "Any and all liquid or solid waste substance, not sewage, from any producing, manufacturing or processing operation of whatever nature."*

Waste water. A term including sewage, industrial wastes, or any combination of the two.

Reclaimed water. Water recovered from sewage and/or industrial waste that is put to beneficial use or is held available for beneficial purposes.

Reclamation. The process of reclaiming water from sewage or industrial wastes for beneficial purposes.

Planned Reclamation. That process of recovery of waste from sewage or industrial waste which was originally conceived and planned for the primary purpose of putting the recovered water to beneficial use.

Incidental Reclamation. That process where the recovery of waste waters for beneficial use is secondary to sewage treatment.

Involuntary Reclamation. The recovery of waste waters for beneficial use which have lost their identity through mixing with natural stream flow or ground water to which they were discharged in the process of final disposal.

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* From Section 13005 of the Water Code.

Primary sewage treatment. That process which removes a portion of the suspended and floating matter from sewage or industrial waste by screening, skimming, sedimentation, or other physical means.

Secondary sewage treatment. Any process of sewage or industrial waste treatment which follows primary or intermediate treatment, and which accomplishes further stabilization of organic matter by biological or chemical action.

CHAPTER II. WASTE DISCHARGE TO TIDEWATERS

This chapter discusses quantity and quality of waste waters discharging to tidewater for the period July 1, 1953 through June 30, 1955, and describes development of sewage treatment facilities during that period.

The quantities of waste water discharged to tidewaters were determined from records of metered flow maintained by the discharging agencies when such records were available. Where such records were not obtainable, flow data were estimated: (a) by discharging agency; (b) from intermittent measurements or partial monthly records; or (c) from calculations on basis of population, using per capita discharge estimates.

The quality data for this report were obtained by analyses of composite samples. When composite samples could not be obtained, single grab samples were collected. Also included are those analyses obtained during the course of other Departmental investigations and those supplied by the discharging agencies.

A summary of the data is presented by water pollution control regions.

San Francisco Bay Region (No. 2)

Data are presented for agencies discharging waste to tidal waters in the amount of one-half million gallons per day or more. There were 39 such agencies on June 30, 1955. These are listed in Table 1; the locations are shown on Plate 1. Data on treatment facilities are presented in Table 2 of the appendix. During the 1953-55 period, new treatment plants were constructed by the City of Millbrae, and by the Hayward, San Pablo, Sausalito-Marin City, and Stege Sanitary Districts. These new facilities treat an estimated 9.8 mgd or 11,000 acre-feet per year of waste water formerly discharged without treatment. These and other developments are summarized in Appendix Table 1.

Appendix Table 3 shows monthly discharges. The total volume of waste discharged in this region is estimated to have been 256,420 acre-feet in 1953-54 and 268,945 acre-feet in 1954-55. These same discharges totaled an estimated 250,260 acre-feet in 1952-53.

About ten per cent of the waste water discharged receives secondary treatment, 68 per cent primary treatment, and 22 per cent no treatment. Mineral and sanitary analyses are presented in Appendix Tables 4 and 5. In accordance with the adopted standards for classification of water, approximately ten per cent of the above waste water would be Class I irrigation water, and thirty-five per cent Class II. The remaining 55 per cent would be Class III; however, much of this approaches the limits of Class II, with excessive chloride and total dissolved solids content being the limiting factors in most cases. A review of previous data for 15 discharges showed that electrical conductivity increased in eight discharges and decreased in seven during the period 1952-53 to 1953-55.

One of the requirements of any reclamation project is that there be a need for supplemental water. Recent studies by the Department have shown that a present an overdraft exists in the Santa Clara Valley at the south end of San Francisco Bay, and that this overdraft is expected to increase under conditions of ultimate development. The quality of ground water in this area is generally excellent. Therefore, reclaimed water having excessive mineral content could be diluted with ground water, providing a mixture of usable quality.

TABLE 1

AVERAGE AND TOTAL WASTE DISCHARGES TO
TIDEWATERS IN SAN FRANCISCO BAY REGION
1953-55

Agencies	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
Marin County Sanitary District No. 1 and No. 2	2.2	2,460	2.8	3,110
City of Mill Valley	0.8	875	0.9	1,020
San Rafael Sanitation District	1.9	2,130	1.9	2,140
Sausalito Marin City Sanitary District	0.6	630	0.9	975
City of Vallejo	6.8[b]	7,620	6.8[b]	7,620
City of Benecia	0.6[b]	720	0.6[b]	720
Central Contra Costa Sanitary District	3.4	3,770	3.8	4,240
Cities of Fairfield and Suisun	0.6[b]	720	0.6[b]	720
City of Richmond	8.2[b]	9,200	8.2[b]	9,200
City of Martinez	0.7[b]	840	0.7[b]	840
City of Concord	1.3	1,480	1.6	1,850
San Pablo Sanitary District	2.9[b]	3,230	2.9[b]	3,230
City of Pittsburg	0.9	1,020	0.9	1,020
Stege Sanitary District	2.7[b]	3,040	2.7[b]	3,040
City of San Leandro	3.2	3,620	3.2	3,550
East Bay Municipal Utility District	54.8	61,400	53.9	60,400
Hayward Sanitary District	1.9[a]	2,090	2.8	3,090
Oro Loma Sanitary District	5.7	6,340	6.5	7,260

a. Discharge estimated from partial records.
b. Discharge estimated on basis of 80 gallons per capita per day.

TABLE 1 (Continued)

AVERAGE AND TOTAL WASTE DISCHARGES TO
TIDEWATERS IN SAN FRANCISCO BAY REGION
1953-55

Agencies	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
Union Sanitary District	0.6	710	0.6	710[a]
City of Mountain View	0.8	885	1.0	1,160
City of Palo Alto	4.2	4,740	4.4	4,920
City of San Jose	16.0[a]	17,900	18.0[a]	20,100
City of Sunnyvale	2.9[a]	3,250	3.3[a]	3,700
City of Burlingame	1.4	1,560	1.4	1,580
City of Millbrae	0.6[a]	620	0.5	580
City of Redwood City	3.0	3,400	3.1	3,470
City of San Mateo	4.5	5,000	4.6	5,140
Cities of South San Francsico and San Bruno	3.3	3,670	3.5	3,960
Menlo Park Sanitary District	2.4	2,690	2.6	2,970
San Carlos-Belmont Sanitary District	1.7	1,950	2.0	2,300
City and County of San Francsico:				
North Point	33.2	37,200	35.8	40,000
Richmond-Sunset Plant	12.2	13,600	12.9	14,400
Southeast Plant	14.0	15,700	15.6[a]	17,500[a]
United States Steel, Columbia-Geneva Division:				
Cooling water	10.5[b]	11,750	10.5[b]	11,750
Oil Waste	5.5[b]	6,160	5.5[b]	6,160

a. Discharge estimated from partial records
b. Discharge estimated by agency

TABLE 1 (Continued)

AVERAGE AND TOTAL WASTE DISCHARGES TO
TIDEWATERS IN SAN FRANCISCO BAY REGION
1953-55

Agencies	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
Mill scale waste	2.0[b]	2,240	2.0[b]	2,240
Johns-Manville Corporation	1.8[b]	2,020	1.8[b]	2,020
Pioneer Rubber Mills	1.7[b]	1,900	1.7[b]	1,900
General Chemical Corporation	4.3[b]	4,820	4.3[b]	4,820
Shell Chemical Company	1.6	1,790	1.6	1,790
C & H Sugar Refinery char waste	1.5[b]	1,680	1.5[b]	1,680
	228.9	256,420	239.9	268,945

a. Discharge estimated from partial records.

b. Discharge estimated by agency.

Central Coastal Region (No. 3)

On June 30, 1955, there were six agencies in this region discharging one million gallons or more per day of waste, as shown on Plate 2. Data on their treatment facilities are presented in Table 2 of the appendix. During the reporting period, no major developments in treatment facilities occurred.

An estimated 14,735 acre-feet of waste water were discharged in 1954-55. In 1953-54, 13,675 acre-feet were discharged, and 13,570 in 1952-53. Monthly discharges, where recorded, are shown in Appendix Table 3.

About 50 per cent of the waste water in this region receives primary treatment, 33 per cent secondary treatment, and 17 per cent no treatment other than screening.

Mineral and sanitary analyses are presented in Appendix Tables 4 and 5. About 40 per cent, or 5,700 acre-feet, of this water is of Class I mineral quality for irrigation, ten per cent in Class II, and 50 per cent Class III. The largest single discharge, 4,840 acre-feet per year at Santa Barbara, is Class III due to its high chloride content. As the present chloride content of ground water in this area is generally high, considerable dilution would be necessary to improve appreciably the quality of this waste discharge.

TABLE 2

AVERAGE AND TOTAL WASTE DISCHARGES TO TIDEWATERS IN CENTRAL COASTAL REGION 1953-55

Agency	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
City of Santa Barbara	4.1	4,620	4.3	4,840
Carmel Sanitary District	0.8[a]	975	0.8[a]	975
City of Monterey	1.3	1,510	1.4	1,570
City of Pacific Grove	0.7	785	1.0	1,190
City of Santa Cruz	2.9	3,260	3.2	3,550
City of Watsonville	2.2[a]	2,525[a]	2.3	2,610
TOTALS	12.0	13,675	13.1	14,735

a. Estimated by agency from partial records.

Los Angeles Region (No. 4)

There were six waste discharges in this region greater than one million gallons per day on June 30, 1955, as shown on Plate 3. Although no new facilities were constructed during the reporting period, the City of Oxnard is planning an additional treatment plant of six million gallons per day capicity. The City of Ventura is planning additional facilities to increase the capacity of its present treatment plant by 50 per cent. The City of Los Angeles is planning to convert from secondary to primary treatment at its Hyperion Plant.

These six agencies discharged an estimated 488,640 acre-feet in 1954-55, and 465,350 acre-feet in 1953-54. In 1952-53, the same discharges totaled 436,440 acre-feet.

Mineral analyses, presented in Appendix Table 4, show that 279,010 acre-feet of the waste water discharged to tidewater in 1954-55 fell within the limits of Class II waters. The remaining 209,630 acre-feet was equivalent to Class III, generally because of high total dissolved solids content. Most of this Class III water was discharged by the Los Angeles County Sanitation District.

Sanitary analyses are shown in Appendix Table 5. Of the six discharging agencies, three provided secondary treatment to 210,570 acre-feet of waste. The remaining three, discharging 278,000 acre-feet provided only primary treatment.

TABLE 3

AVERAGE AND TOTAL WASTE DISCHARGES TO
TIDEWATERS IN LOS ANGELES REGION
1953-55

Agency	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
City of Los Angeles				
Hyperion Plant	239.2	267,900	243.9	273,200
Terminal Island plant	5.6	6,230	6.1	6,840
City of Oxnard[a]	3.7	4,100	3.3	3,680
City of Ventura[b]	1.8	2,020	1.9	2,130
Los Angeles County Sanitation District	164.2	183,900	180.0	201,600
Port Hueneme (United States Construction Battalion Center)[c]	1.1	1,200	1.1	1,190
TOTALS	415.6	465,350	436.3	488,640

a. Meter registered high from July 1953 - April 1954. Actual discharge in 1954-55 was greater than discharge for 1953-54.
b. Discharge in 1954-55 estimated by agency.
c. Estimated from partial records.

Central Valley Region (No. 5)

Many small communities discharge waste water to tidal waters in the Sacramento-San Joaquin Delta area; however, the only discharges greater than one-half million gallons per day during the reporting period were the City of Antioch and the Fibreboard Products Corporation, Antioch and San Joaquin Divisions. Data for these facilities are included in Table 2 of the appendix. It is estimated that these discharges totaled 23,300 acre-feet per year.

The City of Antioch provides primary treatment. No treatment, however, is given to the two industrial discharges. Mineral and sanitary analyses presented in Appendix Tables 4 and 5 show that all three discharges lie within the limits of Class II irrigation water, the principal detriments being total dissolved solids and boron content. The locations of the discharges are shown on Plate 1.

TABLE 4

AVERAGE AND TOTAL WASTE DISCHARGES TO TIDEWATERS IN CENTRAL VALLEY REGION 1953-55

Agency	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
City of Antioch	0.8	900	0.8	900
Fibreboard Products				
Antioch Division	5.0	5,600	5.0	5,600
San Joaquin Division	15.0	16,800	15.0	16,800
TOTALS	20.8	23,300	20.8	23,300

Santa Ana Region (No. 8)

The City of Newport Beach and the Orange County Joint Outfall Sewer were the only two agencies discharging more than one million gallons per day in this region in 1953-54. In 1954-55, they were absorbed by the County Sanitation District of Orange County. The District commenced operation on July 1, 1954, and presently operates two treatment plants, one of which was formerly operated by the Orange County Joint Outfall Sewer. The treatment plants of the Cities of Newport Beach and Huntington Beach were deactivated when these two agencies joined the district. Sewage from these latter cities is now treated at the District Plant No. 2. The locations of these facilities are shown on Plate 4, and brief descriptions of the facilities are presented in Appendix Table 2. The District's Plant No. 1, discharged 13,260 acre-feet in 1954-55, while Plant No. 2 discharged 10,100 acre-feet.

The mineral quality of Plant No. 2 discharge, as given in Appendix Table 4, is extremely poor. The discharge from Plant No. 1, however, is equivalent to Class II waters. Both plants provide primary treatment, and sanitary analyses of their discharges are presented in Appendix Table 5.

At present, serious water shortages exist in the Los Angeles-Santa Ana area. Large quantities of water are being imported at present, and future increases are anticipated. Therefore, the potentialities of waste reclamation are of considerable interest in this area.

TABLE 5

AVERAGE AND TOTAL WASTE DISCHARGES TO
TIDEWATERS IN SANTA ANA REGION
1953-55

Agency	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
City of Newport Beach[a]	2.6	2,910[b]	---	---
Orange County Joint Outfall sewer[a]	13.7	15,300	---	---
Orange County Sanitation District				
Plant No. 1	---	---	11.8	13,260
Plant No. 2	---	---	9.0	10,100
TOTALS	16.3	18,210	20.8	23,360

a. Annexed to Orange County Sanitation District on July 1, 1954.
b. Estimated from partial records.

San Diego Region (No. 9)

The locations of the six agencies which discharge to tidewaters within this region are shown on Plate 5. Data concerning the facilities are listed in Appendix Table 2.

The total discharge was 53,180 acre-feet in 1954-55, and 53,630 in 1953-54. The discharge in 1952-53 was 51,050. The City of San Diego discharges the largest quantity, amounting to about 43,000 acre-feet per year. Monthly discharges are shown in Appendix Table 3.

Appendix Table 4 shows mineral analyses of discharges for this region. Only about 13 per cent, or 6,700 acre-feet of the waste water, is equivalent to Class II waters. The remaining 46,480 acre-feet are in Class III, principally

due to excessive chloride content. Primary treatment is provided for 46,050 acre-feet, and secondary for 960 acre-feet. No treatment is provided for the remaining 6,170 acre-feet. Sanitary analyses are presented in Appendix Table 5.

This area, like the Los Angeles-Santa Ana area, is one of increasing water importation. The possibility, therefore, of providing a portion of the area's ultimate water requirements through reclamation of waste is of considerable economic importance.

TABLE 6

AVERAGE AND TOTAL WASTE DISCHARGES TO
TIDEWATERS IN SAN DIEGO REGION
1953-55

Agency	1953-54		1954-55	
	Average rate of flow in mgd	Annual total in acre-feet	Average rate of flow in mgd	Annual total in acre-feet
City of Chula Vista J Street Plant	1.2	1,370	1.4	1,570
City of Coronado*	1.8	2,000	1.8	2,000
City of Laguna Beach	0.9	1,010	0.9	960
City of Oceanside	1.3	1,440	1.4	1,530
City of San Diego	39.0	43,660	38.3	42,950
International Outfall Sewer	3.7	4,150	3.7	4,170
TOTALS	47.9	53,630	47.5	53,180

* Discharge estimated by agency.

CHAPTER III. RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES

The use of waste water for agriculture and industry is not a new concept. Irrigation with sewage and industrial waste effluents has been practiced for many years. Industry has put reclaimed waste water to use for cooling and boiler feed purposes and for various other plant processes. Recreational use has included irrigation of parks and golf courses, and the formation of artificial lakes, streams, and wildlife refuges. Projects for reclamation of sewage and industrial wastes can be considered either as "planned" or "incidental", depending upon the intent and concept under which the project was developed.

Involuntary reclamation commonly occurs where waste water is discharged to a stream or ground water basin from which water is subsequently withdrawn and put to beneficial use. Since this report pertains only to the discharge of waste waters to tidewater, involuntary reclamation has not been considered. It is planned to include an inventory of discharges where involuntary reclamation occurs in succeeding progress reports.

Existing Reclamation Projects

In Golden Gate Park, San Francisco, planned reclamation of water from sewage has been practiced since 1931. An activated sludge plant in the park intercepts a main trunk sewer to the Richmond-Sunset sewage treatment plant and draws off influent as needed at the rate of about one million gallons per day or 1,100 acre-feet per year. The reclaimed water is used for the maintenance of decorative lakes and for irrigation in the park.

Camp Pendleton Marine Base near Oceanside also has practiced reclamation for some time, using the secondary effluent from the camp's

sewage treatment plant to maintain lakes for conservation and recreational purposes and to irrigate a golf course.

In addition to these larger projects, several discharging agencies utilize small portions of their effluents for irrigation of plant grounds and operation of plant equipment such as chlorinators and scum removal sprays.

Proposed Reclamation Projects

Recognition of reclamation as a beneficial and economical means for final disposal of waste water as well as a means of augmenting or replacing other water supplies has led to new interest in and consequent study on the feasibility of reclamation projects by the State, municipal, and other public and private agencies.

The City of Los Angeles is planning to convert the Hyperion activated sludge plant to a primary treatment plant. Tentative proposals contemplate the utilization of the secondary treatment facilities as a water reclamation plant. The Los Angeles County Flood Control District is currently conducting exhaustive pilot studies to determine the feasibility of using water reclaimed from the Hyperion discharge to supply injection wells in the West Coast Basin for the purpose of preventing sea-water intrusion.

The Talbert Water District is proposing to use effluent from the Orange County Sanitation District for pre-irrigation of beans. It is proposed to divert a portion of the discharge to a regulating reservoir, thence to a distribution system to serve individual farmers. Because of the relatively poor mineral quality of the reclaimed water, it is proposed to use one and one-half acre-feet per acre for pre-irrigation of beans, or about 3,600 acre-feet per year for the entire district, in lieu of the generally used one acre-foot per acre.

The City of Oceanside is considering the reclamation of water from sewage. It is proposed that all the effluent from its sewage reclamation plant be pumped to percolation ponds which would be used to recharge the San Luis Rey ground water basin.

Utilization of the effluent from a planned six mgd secondary plant of the City of Oxnard has been considered by local interests.

A P P E N D I X

SEWERAGE FACILITIES, WASTE DISCHARGES

AND

WASTE ANALYSES

TABLES

TABLE 1

DEVELOPMENT OF SEWERAGE FACILITIES IN CALIFORNIA
July 1, 1953 to June 30, 1955

Region	Agency	Estimated population June 30, 1955	Facilities completed		Facilities under construction		Facilities in planning stage	
			New	Addition	New	Addition	New	Addition
2	Cities of Fairfield and Suisun	8,000					X	
	City of Hayward	30,000	X					
	City of Martinez	16,000					X	
	City of Millbrae	12,000	X					
	North San Mateo County Sanitation District	30,000			X			
	San Francsico International Airport	2,000					X	
	City of San Jose	150,000					X	
	City of San Mateo	60,000				X		
	San Pablo Sanitary	36,000	X					
	Sausalito-Marin City Sanitary District	20,500	X					
	Stege Sanitary District	33,950	X					
	City of Sunnyvale	23,000					X	
	Union Sanitary District	6,000				X		

TABLE 1 (Continued)

DEVELOPMENT OF SEWERAGE FACILITIES IN CALIFORNIA
July 1, 1953 to June 30, 1955

Region	Agency	Estimated population June 30, 1955	Facilities completed		Facilities under construction		Facilities in planning stage	
			New	Addition	New	Addition	New	Addition
3	Pacific Grove	10,000	X					
	Santa Cruz	22,000				X		
	City of Watsonville	15,750					X	
4	City of Los Angeles (Hyperion)	2,750,000						X
	City of Oxnard	30,000					X	
	City of Ventura	22,000						X
8	Orange County Sanitation District	---	X					
9	City of Laguna Beach	7,500						X
	City of Oceanside	20,000						X
	City of San Diego	520,000						
	TOTALS		7	0	1	3	7	4

TABLE 2

SEWERAGE FACILITIES IN CALIFORNIA

(As of June 30, 1955)

DISCHARGING AGENCY	POPULATION SERVED	DISCHARGE			TYPE OF WASTE	DESCRIPTION OF TREATMENT AND FUTURE PLANS	DISPOSITION OF EFFLUENT	REMARKS
		MEAN DAILY (mgd)	SEASONAL acre feet	DESIGN CAPICITY (mgd)				
SAN FRANCISCO BAY REGION								
City of Mill Valley	10,000	0.9	1,010	6.0	Domestic	Comminution, primary clarification and chlorination.	Richardson Bay	
Marin County Sanitary District Nos. 1 and 2	30,000	2.8	3,100	2.3	Domestic	Comminution, clerification biofiltration, secondary clarification and chlorination.	Corte Madera Creek	
Sausalito-Marin, City Sanitary District	20,500	0.87	975	1.6	Domestic	Pre-chlorination and primary clarification	San Francisco Bay	
San Rafael Sanitation District	16,000	1.9	2,130	3.0	Domestic	Primary clarification with pre and post chlorination	San Francisco Bay	
Vallejo Sanitation and Flood Control District	85,000	6.8[a]	7,620	—	Domestic and industrial	Collection system only. Primary treatment plant is planned.	Mare Island Straits	
City of Benicia	8,000	0.6[a]	720	—	Domestic	Collection system only.	Carquinez Straits	
Cities of Fairfield-Suisun	8,000	0.6[a]	720	—	Domestic	Collection system only. Priemry treatment plant is planned.	Suisun Slough	
City of Concord	12,500	1.65	1,840	—	Domestic	Primary clarification and oxidation ponds.	Walnut Creek	
City of Martinez	9,000	0.7[a]	840	—	Domestic and seasonal cannery wastes.	Collection system only. Primary treatment plant is proposed.	Carquinez Straits	
City of Richmond	85,000	8.2[a]	9,140	—	Domestic and industrial	Collection system only. Primary treatment plant is proposed.	San Francisco Bay	
City of Pittsburg	14,000	0.91	1,020	—	Domestic	Grit removal, preaeration, primary clarification and chlorination.	New York Slough	
Central Contra Costa Sanitary District	45,000	3.8	4,240	—	Domestic and seasonal cannery wastes	Primary clarification and oxidation ponds.	Grayson Creek	
San Pablo Sanitary District	36,000	2.9[b]	3,230	7.0	Domestic and industrial	Comminution and primary clarification.	San Pablo Bay	
Stege Sanitary District	34,000	2.7[b]	3,040	—	Domestic	Grit removal and primary clarification.	San Francisco Bay	
City of San Leandro	32,000	4.5	5,040	7.0	Domestic and industrial	Grit removal, clarification, biofiltration, and secondary clarification.	San Francisco Bay	Small amounts reclaimed for plant use.
Hayward Sanitary District	30,000	2.8	3,090	15.0	Domestic and seasonal cannery wastes	Comminution, vacuum flotation, biofiltration, aeration, secondary clarification and chlorination.	San Francisco Bay	
Oroloma Sanitary District	120,000	5.7	6,450	12.0	Domestic	Aeration and primary clarification.	San Francisco Bay	
Union Sanitary District	6,000	0.65	730	3.5	Domestic	Primary clarification.	Newark Slough	
East Bay Municipal Utility District, Special District No. 1	625,000	53.9	60,200	197.0	Domestic and industrial	Primary clarification and chlorination.	San Francisco Bay	

a. Estimated on basis of 80 gallons per capita per day. b. Estimated from periodic measurements. c. Estimated by agency.

TABLE 2-Continued

SEWERAGE FACILITIES IN CALIFORNIA

(As of June 30, 1955)

DISCHARGING AGENCY	POPULATION SERVED	DISCHARGE			TYPE OF WASTE	DESCRIPTION OF TREATMENT AND FUTURE PLANS	DISPOSITION OF EFFLUENT	REMARKS
		MEAN DAILY (mgd)	SEASONAL acre feet	DESIGN CAPACITY (mgd)				
City of Mountain View	13,000	0.92	1,030	2.0	Domestic and food processing.	Primary clarification, aeration and chlorination.	San Francisco Bay	
City of Palo Alto	55,000	4.40	4,900	6.0	Domestic	Grit removal, aeration, vacuator, biofilter, primary clarifier.		
City of San Jose	150,000	18.0[b]	20,100	—	Domestic and industrial.	Collection system only. Primary treatment plant is planned.	San Francisco Bay	
City of Sunnyvale	23,000	3.3[b]	3,700	—	Domestic	Collection system only. Primary treatment plant is planned.	San Francisco Bay	
City of Burlingame	23,600	1.40	1,570	4.0	Domestic	Primary clarification and chlorination.	San Francisco Bay	
City of Millbrae	12,000	0.52	580	1.0	Domestic	Primary clarification.	San Francisco Bay	
City of Redwood City	58,000	3.10	3,470	5.0	Domestic and seasonal cannery waste.	Vacuator, primary clarification and chlorination.	San Francisco Bay	
City of San Mateo	60,000	4.60	5,100	10.0	Domestic	Primary clarification and chlorination.	San Francisco Bay	Small amount reclaimed for plant use.
Cities of South San Francisco San Bruno	50,000	3.50	3,950	8.0	Domestic	Primary clarification.	San Francisco Bay	
Menlo Park Sanitary District	33,000	2.60	2,960	4.0	Domestic	Primary clarification.	San Francisco Bay	
San Carlos-Belmont Sanitary District	30,000	2.00	2,290	3.0	Domestic	Primary clarification.	San Francisco Bay	
City and County of San Francisco								
North Point Plant	450,000	35.8	40,000	65.0	Domestic and industrial.	Grit removal, primary clarification and chlorination.	San Francisco Bay	
Richmond-Sunset Plant	230,000	12.9	14,400	15.0	Domestic	Grit removal, primary clarification and chlorination.	Pacific Ocean	
Southeast Plant	100,000	15.5	17,400	30.0	Domestic and industrial.	Grit removal, primary clarification and chlorination.	San Francisco Bay	
Golden Gate Park Plant	———	0.7	———	1.0	Domestic	Activated sludge.		All of effluent used for irrigation of park, and maintain decorative lakes.
United States Steel Columbia-Geneva Division Cooling water waste	———	10.5[c]	11,750	—	Industrial	None	New York Slough	
Oil waste	———	5.5[c]	6,160	—	Industrial	Sedimentation and skimming.	New York Slough	
Mill scale waste	———	2.0[c]	2,240	—	Industrial	None	New York Slough	
Johns-Manville Products, Pittsburg	———	1.8[c]	2,020	—	Industrial	None	New York Slough	
Pioneer Rubber Mills, Pittsburg	———	1.7[c]	1,900	—	Industrial	None	New York Slough	

a. Estimated on basis of 80 gallons per capita per day. b. Estimated from periodic measurements. c. Estimated by agency.

TABLE 2-Continued

SEWERAGE FACILITIES IN CALIFORNIA

(As of June 30, 1955)

DISCHARGING AGENCY	POPULATION SERVED	DISCHARGE			TYPE OF WASTE	DESCRIPTION OF TREATMENT AND FUTURE PLANS	DISPOSITION OF EFFLUENT	REMARKS
		MEAN DAILY (mgd)	SEASONAL acre feet	DESIGN CAPICITY (mgd)				
General Chemical Corp., Nichols	———	4.3[c]	4,820	—	Industrial	None	Suisun Bay	
Shell Chemical Co., Pittsburg	———	1.6[c]	1,790	—	Industrial	Sedimentation.	Suisun Bay	
C & H Sugar Refinery, Crockett. Char-waste.	———	1.5[c]	1,680	—	Industrial	None	Carquinez Strait	
CENTRAL COASTAL REGION								
City of Monterey	20,000	1.4	1,570	4.0	Domestic	Comminution, primary clarification and chlorination.	Monterey Bay	Small amounts reclaimed for plant uses.
City of Pacific Grove	10,000	1.05	1,170	8.0	Domestic	Comminution, primary clarification and chlorination.	Monterey Bay	
City of Sante Barbara	50,000	4.3	4,840	6.0	Domestic and industrial.	Comminution, clarification, biofiltration, secondary clarification, aeration and chlorination.	Pacific Ocean	
City of Santa Cruz	22,000	3.17	3,550	5.0	Domestic	Aeration, vacuum flotation and chlorination.	Monterey Bay	
City of Watsonville	15,800	2.33	2,615	—	Domestic and food processing	Screening and chlorination. Primary treatment plant is planned with eye to reclaiming processing waste water during summer irrigation season.	Monterey Bay	
Carmel Sanitary District	Variable	0.87	975	—	Domestic	Grit removal, primary clarification and percolation ponds.	Monterey Bay	Some effluent used for irrigation of artichokes.
LOS ANGELES REGION								
City of Los Angeles Terminal Island Plant	20,000	6.11	6,840	—	Domestic and industrial	Screening, primary clarification.	San Pedro Bay	
City of Los Angeles Hyperion Plant	2,750,000	243.9	273,170	245	Domestic and industrial	Activated sludge, chlorination.	Pacific Ocean	
County Sanitation District of Los Angeles County	2,250,000	180	201,000	170	Domestic and industrial	Screening, primary clarification.	Pacific Ocean	
City of Oxnard	30,000	3.20	3,580	2.5	Domestic and industrial	Trickling filtration, chlorination.	Mugu Lagoon	
Port Hueneme, U. S. Construction Battalion	10,000	1.07	890[c]	———	Domestic	Primary clarification (Imhoff tanks)	Pacific Ocean	
City of Ventura	22,000	1.90	2,130	2.0	Domestic and industrial	Primary clarification.	Pacific Ocean	

a. Estimated on basis of 80 gallons per capita per day. b. Estimated from periodic measurements. c. Estimated by agency.

TABLE 2-Continued

SEWERAGE FACILITIES IN CALIFORNIA

(As of June 30, 1955)

DISCHARGING AGENCY	POPULATION SERVED	DISCHARGE			TYPE OF WASTE	DESCRIPTION OF TREATMENT AND FUTURE PLANS	DISPOSITION OF EFFLUENT	REMARKS
		MEAN DAILY (mgd)	SEASONAL acre feet	DESIGN CAPICITY (mgd)				
CENTRAL VALLEY REGION								
City of Antioch	10,000	0.81	900	—	Domestic	Grit removal, pre-aeration and primary clarification.	San Joaquin River	
Fibreboard Products, Antioch Division	———	5.0[c]	5,600	—	Industrial	None	San Joaquin River	
San Joaquin Division	———	15.0[c]	16,800	—	Industrial	None	San Joaquin River	
SANTA ANA REGION								
City of Newport Beach	13,500	2.65[a]	2,660[b]	1.3	Domestic	Screening, primary clarification, chlorination.	Pacific Ocean	De-activated 7-1-54. Flow now goes to Plant No. 2 of County Sanitation Dist. of Orange Co.
Orange County Joint Outfall	125,000	13.66[a]	15,300	20	Domestic and industrial.	Screening, primary clarification, chlorination	Pacific Ocean	Plant owned and operated as Plant No. 1 of County Sanitation District of Orange County as of 7-1-54.
County Sanitation Districts of Orange County								
Plant No. 1	———	11.84	13,270	20	Domestic and industrial.	Screening, primary clarification, chlorination.	Pacific Ocean	
Plant No. 2	177,000 ———	9.02	10,100	30	Domestic and industrial.	Screening, primary clarification, chlorination.	Pacific Ocean	
SAN DIEGO REGION								
City of Chula Vista	23,000	1.40	1,570	1.8	Domestic Industrial	Screening, primary clarification, chlorination. Primary clarification (Imhoff tank).	San Diego Bay San Diego Bay	
City of Coronado	22,900	1.80	2,000	—	Domestic	Collection system only.	San Diego Bay	
International Outfall Sewer	37,000	3.72	4,170	0.50	Domestic	Highly overloaded septic tank.	Pacific Ocean	
City of Laguna Beach	7,500	0.86	960	2.0	Domestic	High-rate activated sludge, chlorination.	Pacific Ocean	
City of Oceanside	20,000	1.37	1,530	2.5	Domestic	Primary clarification, oxidation ponds.	Pacific Ocean	
City of San Diego	520,000	38.34	42,950	70	Domestic and industrial.	Preaeration, primary clarification, chlorination.	San Diego Bay	

a. Estimated on basis of 80 gallons per capita per day. b. Estimated from periodic measurements. c. Estimated by agency.

TABLE 3

WASTE DISCHARGES IN MILLION GALLONS

YEAR AND MONTH	CITY OF MILL VALLEY	MARIN COUNTY SANITARY DISTRICTS NOS. 1 & 2	SAN RAFAEL SANITATION DISTRICT	SAUSALITO MARIN CITY SANITARY DISTRICT	CITY OF CONCORD	CITY OF PITTSBURG	CENTRAL CONTRA COSTA SANITARY DISTRICT	CITY OF SAN LEANDRO	EAST BAY MUNICIPAL UTILITY DISTRICT	HAYWARD SANITARY DISTRICT	ORO LOMA SANITARY DISTRICT	UNION SANITARY DISTRICT
1953-54												
JULY	15.3	65.0		11.1	43.3	29.5	83.9	101.8	1,525.5		165.9	
AUGUST	18.1	56.0		18.1	40.5	29.4	82.7	98.9	1,523.4		155.0	
SEPTEMBER	15.5	59.0		19.0	38.2	27.3	91.6	97.2	1,663.3		155.0	
OCTOBER	15.0	61.0	47.2	19.7	37.8	26.6	100.0	97.4	1,617.7		158.0	
NOVEMBER	18.8	78.0	54.8	32.2	31.0	25.9	87.9	89.4	1,555.9		152.0	
DECEMBER	22.8	75.0	53.8	10.8	32.2	25.2	85.9	88.4	1,573.0		170.0	
JANUARY	33.0	70.4	70.6	15.7	34.1	30.5	112.6	98.0	1,804.0	41.4	180.0	
FEBRUARY	31.1	73.3	73.3	14.2	45.7	27.5	135.0	96.7	1,802.2	55.7	168.0	
MARCH	45.3	77.9	64.5	16.8	51.4	29.0	125.1	120.3	1,971.0	64.9	204.6	
APRIL	32.2	64.1	65.2	11.6	41.8	27.6	121.1	102.1	1,744.5	57.9	192.0	
MAY	20.7	62.5	48.6	13.8	44.6	27.8	106.3	97.4	1,679.0	63.6	189.1	
JUNE	18.2	59.8	41.7	20.5	40.5		99.7	91.1	1,594.4	58.3	171.0	
SEASONAL TOTAL												
MILLION GALLONS	286.0	802.0	519.7*	203.5	481.1	306.3*	1,231.8	1,178.7	19,593.9	341.8*	2,066.5	
ACRE-FEET	875	2,460	2,130	630	1,480	1,020	3,770	3,620	61,400	2,090	6,340	
1954-55												
JULY	18.5	69.6	47.5	20.4	39.1		105.5	96.2	1,593.2	78.2	167.4	14.2
AUGUST	15.3	62.6	48.4	23.5	39.0	28.2	111.8	96.7	1,645.7	132.2	164.3	20.7
SEPTEMBER	18.6	51.8	42.6	21.7	37.4	27.5	110.6	99.5	1,619.6	136.5	165.0	34.8
OCTOBER	30.1	56.2	41.1	22.7	38.7	30.1	109.0	91.4	1,585.7	117.9	167.4	23.1
NOVEMBER	21.8	91.0		25.0	41.2	29.1	99.3	104.3	1,584.4	68.5	174.0	16.6
DECEMBER	45.6	128.3		33.8	56.0	31.6	155.0	91.0	1,743.7	69.9	226.3	16.9
JANUARY	53.6	123.6	60.4	44.7	63.2	29.0			1,983.3	61.3	310.0	20.7
FEBRUARY	26.8	90.8	71.6	26.2	58.1	24.7			1,490.8	63.4	267.2	16.9
MARCH	25.1	90.6	74.7	25.7	63.8	26.2			1,679.5	69.2	198.4	16.2
APRIL	30.8	103.3	63.8	24.5	57.3	25.8			1,644.9	65.6	192.0	17.3
MAY	23.4	84.3	69.1	24.0	59.6	26.4			1,604.2	68.1	198.4	20.0
JUNE	21.2	61.1	60.7		49.4	27.8			1,514.0	75.6	195.0	24.3
SEASONAL TOTAL												
MILLION GALLONS	330.8	1,013.2	5,799*	292.2*	602.8	306.4*	691.2*	578.1*	19,689.0	1,006.4	2,365.4	231.7
ACRE-FEET	1,020	3,110	2,140	975	1,850	1,030	4,240	3,550	60,400	3,090	7,260	710

* Partial records only, seasonal total in acre-feet estimated.

TABLE 3-Continued

WASTE DISCHARGES IN MILLION GALLONS

YEAR AND MONTH	CITY OF MOUNTAIN VIEW	CITY OF PALO ALTO	CITY OF BURLINGAME	CITY OF MILLBRAE	CITY OF REDWOOD CITY	CITY OF SAN MATEO	CITIES OF SOUTH SAN FRANCISCO-SAN BRUNO	MENLO PARK SANITARY DISTRICT	SAN CARLOS-BELMONT SANITARY DISTRICT	SAN FRANCISCO NORTH POINT	SAN FRANCISCO RICHMOND SUNSET	SAN FRANCISCO SOUTH EAST
1953-54												
JULY	20.0	126.1	33.8		74.2	147	107.8	62.0	43.4	954.9	379.7	271.7
AUGUST	21.7	118.8	32.0		95.4		103.1	61.3	43.4	969.3	385.6	329.9
SEPTEMBER	24.9	114.2	31.6		90.4		97.5	58.8	45.0	936.6	387.6	315.5
OCTOBER	23.6	125.9	31.5	15.5	88.6	158	97.8	70.9	55.8	1,019.7	405.8	442.6
NOVEMBER	19.8	121.6	36.5	15.0	91.8	159	92.6	77.6	60.0	1,049.9	348.2	502.9
DECEMBER	23.6	124.3	37.5	14.9	91.1		87.7	77.9	57.7	1,043.4	276.1	477.2
JANUARY	25.6	137.4	47.7	18.0	112.8		110.1	82.6	52.7	1,171.4	393.0	452.9
FEBRUARY	23.3	127.8	56.3	18.5	101.5		102.8	76.3	61.6	1,034.0	290.5	319.8
MARCH	26.7	134.4	72.6		84.5		129.9	86.5	71.3	1,213.5	325.1	476.8
APRIL	26.0	135.2	49.4	24.9	92.7		95.3	74.2	54.0	775.6	400.3	460.8
MAY	26.5	151.0	40.1	16.1	92.1		88.6	76.3	49.6	980.9	443.8	529.1
JUNE	26.6	127.0	40.1	14.7	95.2		85.7	71.5	48.0	979.6	405.1	552.4
SEASONAL TOTAL												
MILLION GALLONS	288.3	1,543.7	509.1	137.6*	1,110.3	464*	1,198.9	875.9	637.5	12,128.8	4,440.8	5,131.6
ACRE-FEET	885	4,740	1,560	638	3,400	5,000	3,670	2,690	1,960	37,200	13,600	15,700
1954-55												
JULY	27.3	126.0	36.7	14.3	100.9		89.2	74.5	46.5	1,008.9	411.0	437.0
AUGUST	28.2	120.9	38.1	14.3	105.4		94.7	72.5	40.3	1,015.4	417.5	445.0
SEPTEMBER	28.5	113.5	38.5	15.0	92.0		85.0	72.7	48.0	983.8	393.7	386.8
OCTOBER	29.1	126.1	32.2	16.7	84.2		90.3	77.7	46.5	1,048.8	420.4	432.0
NOVEMBER	27.9	130.1	38.3	14.4	79.6	90	101.8	76.2	54.0	1,115.5	376.6	474.0
DECEMBER	31.9	137.6	62.0	18.0	113.8	118	132.4	82.7	74.4	1,309.9	391.3	676.0
JANUARY	36.3	154.2	69.4	18.6	118.9	208	135.7	89.5	74.4	1,316.0	305.4	
FEBRUARY	33.3	134.9	46.0	17.4	88.4	151	113.4	78.9	81.2	1,026.4	350.4	
MARCH	36.3	144.9	42.8	18.3	92.7	122	129.5	86.8	77.5	1,077.7	396.1	
APRIL	33.9	138.2	38.7	15.0	88.0	141	96.2	83.4	66.0	1,122.4	406.9	
MAY	34.1	142.8	36.6	15.2	86.4	140	111.5	89.4	74.4	1,025.9	406.1	
JUNE	31.5	133.9	34.3	13.5	82.2	141	111.4	83.2	66.0	1,001.7	409.7	
SEASONAL TOTAL												
MILLION GALLONS	378.3	1,603.1	513.6	190.7	1,132.5	1,111*	1,291.1	967.5	749.2	13,052.4	4,705.1	2,850.8*
ACRE-FEET	1,160	4,920	1,580	582	3,470	5,140	3,960	2,970	2,300	40,000	14,400	17,500

* Partial records only, seasonal total in acre-feet estimated.

TABLE 3-Continued

WASTE DISCHARGES IN MILLION GALLONS

YEAR AND MONTH	CITY OF MONTEREY	CITY OF PACIFIC GROVE	CITY OF SANTA CRUZ	CITY OF WATSONVILLE	CITY OF LOS ANGELES HYPERION PLANT	CITY OF LOS ANGELES TERMINAL ISLAND PLANT	CITY OF OXNARD	CITY OF VENTURA	SANITATION DISTRICTS OF LOS ANGELES COUNTY	PORT HUENEME U.S.N.C.B.	CITY OF ANTIOCH	CITY OF NEWPORT BEACH**
1953-54												
JULY	35.4	9.0			7,426.1	176.8	116.6	55.8	4,398.8	29.2	25.1	99.9
AUGUST	38.8	14.1			7,205.6	170.1	112.4	55.8	4,452.7		24.5	107.7
SEPTEMBER	37.8	21.6			7,068.6	158.8	113.2	54.0	5,661.6		24.2	83.3
OCTOBER	37.6	20.1			7,340.8	161.0	119.5	55.8	4,537.4	30.3	24.8	81.1
NOVEMBER	37.0	20.8			6,982.8	144.8	120.7	54.0	4,548.6	29.8	23.8	77.2
DECEMBER	37.9	19.7			6,940.3	183.7	116.0	55.8	4,517.1	30.7	24.1	71.4
JANUARY	44.0	23.5		51.8	7,394.1	191.1	104.4	55.8	5,730.9	32.3	25.9	72.6
FEBRUARY	40.0	20.9		48.3	6,820.2	154.5	97.3	50.4	4,566.1	32.6	23.4	69.1
MARCH	48.9	30.8		65.3	7,679.0	167.1	121.7	55.8	5,903.1	33.3	26.3	75.5
APRIL	46.2	29.1		74.8	7,413.6	185.1	122.9	54.0	4,787.3	33.2	26.6	76.8
MAY	46.2	22.1		76.8	7,538.9	161.7	93.1	55.8	4,806.2	37.8	26.5	57.8
JUNE	39.8	24.9		60.4	7,482.6	178.0	97.3	54.0	6,017.9	37.0	24.5	
SEASONAL TOTAL												
MILLION GALLONS	492.6	257.5	1,062*	821.2*	87,292.6	2,032.7	1,335.1*	657.0	59,927.7	326.2*	299.7	872.4*
ACRE-FEET	1,510	784	3,260	2,520	267,900	6240	4,100	2,020	183,900	1,200	896	2,910
1954-55												
JULY	41.5	26.2		55.6	7726.8	203.4	96.5	58.9	4,900	40.5	25.1	
AUGUST	42.0	24.4		74.2	7,673.4	185.3	99.4	58.9	5,100	3629	24.7	
SEPTEMBER	38.7	30.4		71.8	7,394.1	188.8	98.6	57.0	7,700		23.4	
OCTOBER	39.4	30.9		89.2	7,562.8	187.8	102.2	58.9	5,000		23.6	
NOVEMBER	36.5	24.6		89.8	7,112.4	179.2	101.4	57.0	5,000	35.0	23.3	
DECEMBER	38.6	31.8		82.4	7,414.9	186.9	106.1	58.9	6,200	32.5	25.2	
JANUARY	58.5	47.7	168.5	79.2	7,658.5	192.4	101.8	58.9	4,900	32.9	25.4	
FEBRUARY	42.9	37.5	89.4	60.0	6,896.4	168.1	93.0	53.2	4,800	30.8	23.0	
MARCH	44.4	57.8	94.5	67.7	7,552.5	187.7	98.5	58.9	6,100	31.0	26.0	
APRIL	45.0	29.6	99.1	77.6	7,295.7	180.5	98.4	57.0	4,900		24.6	
MAY	45.0	34.4	81.1	55.0	7,449.3	182.2	105.2	58.9	4,900	31.2	25.8	
JUNE	38.9	31.4	79.0	49.5	7,274.7	187.9	98.5	57.0	6,200	19.7	24.7	
SEASONAL TOTAL												
MILLION GALLONS	511.4	386.7	1,156.4*	852.0	89,011.5	2,230.2	1,199.6	693.5	65,700	290.5*	294.8	
ACRE-FEET	1,570	1,190	3,550	2,610	273,170	6,840	3,680	2,130	201,600	1,190	896	

* Partial records only, seasonal total in acre-feet estimated.

** Annexed to Orange County Sanitation Districts, July 1, 1954

TABLE 3-Continued

WASTE DISCHARGES IN MILLION GALLONS

YEAR AND MONTH	ORANGE COUNTY JOINT OUTFALL SEWER**	ORANGE COUNTY SANITATION DISTRICT PLANT #1	ORANGE COUNTY SANITATION DISTRICT PLANT #2	CITY OF CHULA VISTA P STREET PLANT	CITY OF LAGUNA BEACH	CITY OF OCEANSIDE	CITY OF SAN DIEGO	INTERNATIONAL OUTFALL SEWER				
1953-54												
JULY	436.9			29.8	38.5	44.3	1,139.1	119				
AUGUST	441.3			38.1	42.2	43.7	1,158.0	117				
SEPTEMBER	430.5			37.1	28.7	40.7	1,127.7	112				
OCTOBER	449.7			37.8	26.5	38.1	1,176.0	109				
NOVEMBER	401.1			38.8	26.6	37.9	1,174.0	102				
DECEMBER	381.0			40.4	27.1	38.8	1,171.1	115				
JANUARY	421.0			39.8	22.5	39.1	1,301.1	113				
FEBRUARY	375.6			32.7	21.3	34.6	1,150.3	104				
MARCH	405.8			35.4	23.8	38.2	1,379.7	118				
APRIL	409.0			38.5	23.2	36.8	1,176.7	112				
MAY	416.2			40.0	23.8	39.5	1,150.9	114				
JUNE	417.0			39.3	24.4	38.4	1,122.0	117				
SEASONAL TOTAL												
MILLION GALLONS	4,985.1			447.7	328.6	470.1	14,226.6	1,352				
ACRE-FEET	15,300			1,370	1,010	1,440	43,660	4,150				
1954-55												
JULY		345.1	240.7	41.9	34.7	41.9	905.0	119				
AUGUST		351.8	304.5	44.5	39.7	44.8	1,199.9	114				
SEPTEMBER		368.4	280.9	43.8	27.0	37.7	1,174.1	111				
OCTOBER		366.5	271.8	43.1	22.9	37.5	1,181.9	109				
NOVEMBER		355.0	226.1	42.7	21.5	38.1	1,149.5	115				
DECEMBER		362.9	219.0	42.0	21.6	38.6	1,173.4	116				
JANUARY		373.5	234.5	42.3	24.1	40.2	1,276.5	115				
FEBRUARY		298.6	272.4	37.3	23.8	37.3	1,123.8	106				
MARCH		403.7	238.0	41.6	23.4	42.2	1,235.4	111				
APRIL		310.2	340.7	40.7	24.4	44.5	1,156.0	113				
MAY		416.3	299.2	42.1	24.5	47.9	1,255.6	117				
JUNE		371.3	365.7	48.5	26.6	47.9	1,164.4	113				
SEASONAL TOTAL												
MILLION GALLONS		4,323.3	3,293.5	510.5	314.2	498.6	13,995.5	1,359				
ACRE-FEET		13,260	10,100	1,570	960	1,530	42,950	4,170				

* Partial records only, seasonal total in acre-feet estimated.

** Annexed to Orange County Sanitation Districts, July 1, 1954

TABLE 4

MINERAL ANALYSIS
SEWAGE AND INDUSTRIAL WASTES

Discharging Agency	Date	Mean daily discharge mgd	Temp. °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids ppm	Per cent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C. ppm	Remarks
SAN FRANCISCO BAY REGION[a]																						
City of Mill Valley	4/22/54	0.7		1,990	7.3	27 / 1.35	48 / 3.95	240 / 10.44	18 / 0.46	0 / 0.00	334 / 5.47	41 / 0.85	415 / 11.70	0.0 / 0.00	0.6 / 0.03	0.44	22	1,020	56	265	0	
San Rafael Sanitary District	4/30/54	2.2		3,050	7.3	44 / 2.20	68 / 5.59	446 / 19.39	22 / 0.56	0 / 0.00	336 / 5.51	200 / 4.16	710 / 20.02	1.2 / 0.02	0.4 / 0.02	0.52	19	1,680	65	390	114	
Sausalito-Marin City Sanitary District	4/28/54	0.6	64	3,030	7.2	88 / 4.40	40 / 3.29	450 / 19.57	24 / 0.61	0 / 0.00	200 / 3.28	120 / 2.50	800 / 22.56	3.6 / 0.06	0.4 / 0.02	0.16	16	1,560	70	384	220	
City of Vallejo, North Outfall	4/23/54	1.7	65	2,290	7.4	46 / 2.30	58 / 4.77	284 / 12.34	18 / 0.46	0 / 0.00	4.92 / 8.06	132 / 2.75	426 / 12.01	1.3 / 0.02	2.8 / 0.15	1.8	28	1,290	55	354	0	Raw Sewage
South Outfall	4/23/54	1.5	66	1,980	7.3	34 / 1.70	60 / 4.93	219 / 9.52	23 / 0.59	0 / 0.00	518 / 8.49	115 / 2.39	305 / 8.60	0 / 0.00	1.0 / 0.05	0.69	25	1,090	49	332	0	Raw Sewage
Cities of Fairfield - Suisun	4/29/54	0.8		1,450	7.6	26 / 1.30	47 / 3.87	180 / 7.83	14 / 0.36	0 / 0.00	564 / 9.24	55 / 1.15	119 / 3.36	0.7 / 0.01	2.0 / 0.11	1.9	29	752	59	258	0	Raw Sewage
City of Benicia	4/26/54	1.3	66	1,790	7.6	18 / 0.90	75 / 6.17	173 / 7.53	16 / 0.41	0 / 0.00	672 / 11.01	65 / 1.35	206 / 5.81	0 / 0.00	2.0 / 0.11	1.4	32	969	42	354	0	Raw Sewage
Central Contra Costa Sanitary District	3/24/54	2.7		1,130	7.4	46 / 2.30	32 / 2.63	112 / 4.87	10 / 0.26	0 / 0.00	308 / 5.05	145 / 3.02	103 / 2.90	0 / 0.00	0.6 / 0.03	0.61	24	638	45	246	0	
City of Concord	3/25/54	1.4		1,630	7.6	94 / 4.69	55 / 4.52	174 / 7.57	7.3 / 0.19	0 / 0.00	471 / 7.72	227 / 4.73	178 / 5.02	8.6 / 0.14	0.8 / 0.04	0.99	26	1,000	44	460	74	
City of Martinez	4/2/54	0.9	65	1,600	7.3	51 / 2.54	43 / 3.54	178 / 7.74	19 / 0.49	0 / 0.00	467 / 7.65	126 / 2.62	182 / 5.13	7.6 / 0.12	0.9 / 0.05	0.0	31	892	50	304	0	
City of Pittsburg	3/18-19/1954	1.0		2,110	7.4	68 / 3.39	41 / 3.37	243 / 10.57	15 / 0.38	0 / 0.00	362 / 5.93	197 / 4.10	370 / 10.44	0.3 / 0.00	0.9 / 0.05	0.85	25	1,180	53	338	42	
City of Richmond, Castro Street	3/31/54	1.3	66	19,800	8.8	85 / 4.24	419 / 34.46	4020 / 174.81	154 / 3.94	187 / 6.23	1110 / 18.19	898 / 18.70	6280 / 177.12	4.7 / 0.08	0.5 / 0.03	2.2	14	12,600	80	1940	714	Raw Sewage
South 10th. Street	3/31/54	0.25	63	1,010	7.1	34 / 1.70	13 / 1.07	109 / 4.74	12 / 0.31	0 / 0.00	288 / 4.72	2.6 / 0.05	155 / 4.37	10 / 0.16	1.0 / 0.05	0.38	26	536	50	138	0	Raw Sewage
Columbia - Geneva Steel, Pittsburg Cooling Water Outfall	3/17/54	10.5		566	7.1	26 / 1.30	14 / 1.15	67 / 2.91	2.2 / 0.06	0 / 0.0	74 / 1.21	101 / 2.10	67 / 1.89	0.4 / 0.01	0.2 / 0.01	0.31	13	327	54	122	62	
Oil Waste	3/17/54	5.5		428	6.9	19 / 0.95	11 / 0.91	44 / 1.91	1.8 / 0.05	0.0 / 0.0	54 / 0.89	48 / 1.0	67 / 1.89	1.2 / 0.02	0.1 / 0.01	0.17	17	236	50	93	48	
Mill Scale	3/16/54	2.0		636	6.7	36 / 1.80	14 / 1.15	62 / 2.70	2.5 / 0.06	0 / 0.0	32 / 0.52	112 / 2.33	101 / 2.85	2.0 / 0.03	0.1 / 0.01	4.5	10	360	57	148	122	
Johns-Manville, Pittsburg Outfall	3/19/54	1.8	62	416	8.2	42 / 2.10	6.7 / 0.55	30 / 1.31	19 / 0.49	0 / 0.0	136 / 2.23	57 / 1.19	28 / 0.79	2.3 / 0.04	0.4 / 0.02	1.3	36	290	29	132	21	
Pioneer Rubber Mills	3/18/54	1.7	66	214	7.2	13 / 0.65	6.6 / 0.54	17 / 0.74	1.4 / 0.04	0 / 0.0	53 / 0.87	18 / 0.38	26 / 0.73	0.9 / 0.02	0.1 / 0.01	0.12	16	125	38	60	16	
General Chemical Corporation (Nichols)	3/22/54	4.3	77	375	3.7	15 / 0.75	8.0 / 0.66	17 / 0.74	1.5 / 0.04	0 / 0.0	0 / 0.0	101 / 2.10	22 / 0.62	0.4 / 0.01	0.2 / 0.01	0.11	15	181	26	70	70	

a Analyses by United States Geological Survey, Quality of Water Branch, Sacramento.

TABLE 4-Continued

MINERAL ANALYSIS
SEWAGE AND INDUSTRIAL WASTES

Discharging Agency	Date	Mean daily discharge mgd	Temp. °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids ppm	Per cent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C. ppm	Remarks
SAN FRANCISCO BAY REGION (Cont'd).																						
Shell Chemical Company, Pittsburg Pond Discharge	3/25/54	1.6		767	3.4	16 / 0.80	10 / 0.82	52 / 2.26	2.4 / 0.06	0 / 0.0	0 / 0.0	206 / 4.49	52 / 1.47	0.4 / 0.01	0.1 / 0.01	0.11	17	356	40	81	81	
C & H Sugar Refinery, Crockett Char-Waste Water	5/3/54	1.5	62	658	5.1	92 / 4.59	13 / 1.07	20 / 0.87	81 / 0.21	0 / 0.0	0 / 0.0	80 / 1.67	34 / 0.96	0.2 / 0.0	0.0 / 0.00	0.39	18		13	283		
City of San Leandro	5/11-12/1954	3.9	75	1,210	7.7	50 / 2.50	21 / 1.73	148 / 6.44	9.2 / 0.24	0 / 0.00	419 / 6.87	2.3 / 0.05	162 / 4.57	1.0 / 0.02	0.6 / 0.03	0.74	27	582	55	212	0	Combined effluent.
	3/9/55	1.9		1,620	6.9	63 / 3.14	23 / 1.91	208 / 9.04	14 / 0.36	0 / 0.00	358 / 5.87	67 / 1.39	289 / 8.15	1.3 / 0.02		0.82	22	901	56	253	0	Domestic effluent.
	3/10/55	1.9		1,500	7.0	52 / 2.59	32 / 2.61	172 / 7.48	14 / 0.36	0 / 0.00	370 / 6.06	61 / 1.27	242 / 6.83	1.6 / 0.03		0.87	22	831	51	260	0	Domestic effluent.
	3/11/55	1.8		1,570	7.2	52 / 2.59	34 / 2.81	189 / 8.22	15 / 0.38	0 / 0.00	402 / 6.59	65 / 1.35	253 / 7.14	1.6 / 0.03		0.84	24	885	53	270	0	Domestic effluent.
	3/12/55	1.3		1,290	7.1	72 / 3.59	16 / 1.35	138 / 6.00	13 / 0.33	0 / 0.00	394 / 6.46	85 / 1.77	165 / 4.65	1.3 / 0.02		0.62	24	773	45	247	0	Domestic effluent.
	3/13/55	1.8		1,140	7.3	44 / 2.20	31 / 2.56	99 / 4.30	12 / 0.31	0 / 0.00	390 / 6.39	67 / 1.39	118 / 3.33	0.4 / 0.01		0.45	22	657	37	238	0	Domestic effluent.
	3/14/55	1.8		1,170	7.2	44 / 2.20	29 / 2.36	119 / 5.17	12 / 0.31	0 / 0.00	386 / 6.33	60 / 1.25	136 / 3.84	0.5 / 0.01		0.82	24	682	44	228	0	Domestic Effluent.
	3/15/55	0.9		1,270	6.9	64 / 3.19	20 / 1.68	144 / 6.26	13 / 0.33	0 / 0.00	360 / 5.90	62 / 1.29	206 / 5.81	1.4 / 0.02		0.69	24	763	47	243	0	Domestic effluent.
	3/16/55	1.7		1,190	6.7	67 / 3.34	15 / 1.27	130 / 5.65	13 / 0.33	0 / 0.00	360 / 5.90	64 / 1.33	161 / 4.54	1.2 / 0.02		0.88	21	700	46	231	0	Domestic effluent.
	3/9/55	1.7		1,390	6.8	61 / 3.04	16 / 1.29	208 / 9.04	8.4 / 0.21	0 / 0.00	357 / 5.85	42 / 0.87	236 / 6.66	1.0 / 0.02		1.6	28	783	65	217	0	Industrial effluent.
	3/10/55	1.7		1,260	6.8	61 / 3.04	21 / 1.72	170 / 7.39	8.2 / 0.21	0 / 0.00	336 / 5.51	66 / 1.37	192 / 5.42	1.1 / 0.02		1.4	27	714	60	238	0	Industrial effluent.
	3/11/55	1.7		1,260	6.8	58 / 2.89	22 / 1.79	174 / 7.57	7.6 / 0.19	0 / 0.00	332 / 5.44	64 / 1.33	191 / 5.39	1.1 / 0.02		1.2	29	712	61	234	0	Industrial effluent.
	3/12/55	1.3		1,220	6.9	66 / 3.29	19 / 1.59	152 / 6.61	8.4 / 0.21	0 / 0.00	353 / 5.79	85 / 1.77	163 / 4.60	1.2 / 0.02		1.4	26	708	53	244	0	Industrial effluent.
	3/13/55	0.9		1,160	7.9	66 / 3.29	22 / 1.82	156 / 6.78	9.6 / 0.25	0 / 0.00	360 / 5.90	80 / 1.67	164 / 4.63	1.2 / 0.02		1.5	33	720	53	256	0	Industrial effluent.
	3/14/55	1.1		1,210	6.9	57 / 2.84	27 / 2.20	140 / 6.09	8.2 / 0.21	0 / 0.00	368 / 6.03	59 / 1.23	164 / 4.63	1.6 / 0.03		0.89	28	683	50	252	0	Industrial effluent.
	3/15/55	1.0		1,320	6.9	76 / 3.79	18 / 1.46	158 / 6.87	9.2 / 0.24	0 / 0.00	378 / 6.19	50 / 1.04	203 / 5.73	1.6 / 0.03		0.79	28	746	52	262	0	Industrial effluent.
	3/16/55	1.1		1,260	6.8	65 / 3.24	22 / 1.80	160 / 6.96	8.4 / 0.21	0 / 0.00	370 / 6.06	61 / 1.27	186 / 5.25	1.1 / 0.02		0.72	28	728	53	252	0	Industrial effluent.

TABLE 4-Continued

MINERAL ANALYSIS
SEWAGE AND INDUSTRIAL WASTES

Discharging Agency	Date	Mean daily discharge mgd	Temp. °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million												Total dissolved solids ppm	Per cent sodium	Hardness as $CaCO_3$		Remarks
						Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)			Total ppm	N.C. ppm	
SAN FRANCISCO BAY REGION (Cont'd)																						
Hayward Sanitary District	5/3/54	2.4		1,580	7.5	16 0.80	20 1.64	222 9.65	20 0.51	0 0.00	316 5.18	55 1.15	302 8.52	1.4 0.02	2.8 0.15	0.48	20	858	64	122	0	
	5/14/55	2.4		1,190	7.6	28 1.40	18 1.44	120 5.22	15 0.38	0 0.00	348 5.70	47 0.98	147 4.15	0.5 0.01		0.51	21	619	47	142	0	
Oro Loma Sanitary District	5/4/54	5.9		1,270	8.1	83 4.14	24 1.97	106 4.61	12 0.31	0 0.00	586 9.60	8.6 0.18	112 3.16	0.8 0.01	1.2 0.06	0.37	24	660	34	306	0	
	3/14/55	6.9		1,140	7.1	36 1.80	36 2.96	110 4.78	12 0.31	0 0.00	436 7.15	85 1.77	86 2.43	0.7 0.01		0.66	24	699	40	238	0	
Union Sanitary District	4/12-13/1954	1.1	64	1,500	7.4	60 3.00	43 3.54	154 0.70	17 0.43	0 0.00	440 7.21	76 1.58	206 5.81	0 0.00	0.7 0.04	1.1	28	828	45	326	0	
	3/14/55			1,950	7.4	62 3.09	48 3.95	228 9.91	22 0.56	0 0.00	554 9.08	112 2.33	284 8.01	1.2 0.02		1.1	34	1,150	50	352	0	
East Bay Municipal Utility District	5/11-12/1954	60.0	72	1,730	7.2	35 1.75	32 2.63	244 10.61	28 0.72	0 0.00	40 0.66	99 2.06	385 10.86	137 2.21	0.8 0.04	0.26	24	1,000	68	219	186	
City of Mountain View	4/14/54	0.8		3,970	7.8	143 7.14	104 8.55	476 20.70	23 0.59	0 0.00	676 11.08	172 3.58	870 24.54	0 0.00	0.9 0.05	0.60	38	2,210	52	784	230	
	3/16/55	1.2		4,860	7.8	268 13.37	60 4.95	655 28.48	30 0.77	0 0.00	731 11.98	206 4.29	1220 34.41	1.2 0.02		0.56	45	2,920	57	916	317	
City of Palo Alto	4/12/13/1954	4.6		2,000	7.4	62 3.10	49 4.03	236 10.26	16 0.41	0 0.00	522 8.55	74 1.54	355 10.01	0 0.00	0.9 0.05	0.69	30	1,120	52	356	0	
	3/16-17/1955	4.7		2,359	7.5	84 4.19	42 3.45	307 13.35	17 0.44	0 0.00	521 8.55	115 2.39	458 12.91	1.3 0.02		0.62	34	1,357	57	386	0	Weighted mean of 3-8 hr. composite sample.
City of San Jose	4/6-7/54	24.7	72	2,910	6.3	68 3.39	28 2.30	335 14.57	170 4.35	0 0.00	502 8.23	41 0.85	560 15.79	14 0.23	0.7 0.04	0.71	36	1,520	57	284	0	Raw Sewage.
	4/7-8/54	24.6	70	2,800	6.2	68 3.39	34 2.80	320 13.91	170 4.35	0 0.00	523 8.57	26 0.54	540 15.23	23 0.37	0.9 0.05	0.61	40	1,480	56	310	0	Raw Sewage.
City of Sunnyvale	4/8/54	1.0		1,050	7.2	43 2.15	24 1.97	93 4.04	31 0.79	0 0.00	466 7.64	27 0.56	65 1.83	0 0.00	0.7 0.04	1.3	39	574	40	206	0	Raw Sewage.
	4/14/54	1.6	74	1,060	7.2	46 2.30	30 2.47	87 3.78	33 0.84	0 0.00	464 7.60	35 0.73	62 1.75	0 0.00	0.6 0.03	0.88	38	569	38	238	0	Raw Sewage.
City of Burlingame	4/19/54	1.4		1,110	7.2	17 0.85	27 2.22	116 5.04	13 0.33	0 0.00	378 6.19	1.8 0.04	132 3.72	0.5 0.01	0.4 0.02	0.61	21	545	50	154	0	
	3/16/55	1.2		974	7.0	22 1.10	21 1.71	91 3.96	12 0.31	0 0.00	352 5.77	29 0.60	103 2.90	0.7 0.01		0.48	23	557	40	140	0	
City of Millbrae	4/20/54	0.5		1,170	7.3	19 0.95	30 2.47	120 5.22	12 0.31	0 0.00	362 5.93	54 1.12	135 3.81	0 0.00	1.4 0.07	0.69	21	615	46	171	0	
	3/16/55	0.5		1,030	7.3	19 0.95	21 1.75	93 4.04	14 0.36	0 0.00	354 5.80	32 0.67	104 2.93	1.0 0.02		0.82	26	484	41	135	0	
City of Redwood City	4/12-14/1954	2.9	66	2,130	7.3	77 3.84	37 3.04	262 11.39	15 0.38	0 0.00	495 8.11	31 0.65	420 11.85	0.2 0.00	0.4 0.02	1.2	18	1,110	54	344	0	
	3/16-17/1955	2.9	66	2,137	6.9	61	45	261	16	0	370	143	428	0.9		0.55	21	1,220	54	337	34	Weighted mean of 3-8 hr. composite samples.

b - Analyses by State Department of Public Health.

TABLE 4-Continued

MINERAL ANALYSIS
SEWAGE AND INDUSTRIAL WASTES

Discharging Agency	Date	Mean daily discharge mgd	Temp. °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million												Total dissolved solids ppm	Per cent sodium	Hardness as $CaCO_3$		Remarks
						Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)			Total ppm	N.C. ppm	
SAN FRANCISCO BAY REGION (Cont'd):																						
City of San Mateo	3/16/55	4.6		3,490	7.2	64 3.19	85 7.03	492 21.39	30 0.77	0 0.00	348 5.70	190 3.93	892 25.16	0.9 0.01		0.54	21	2,020	62	511	226	
Cities of South San Francisco-San Bruno	4/21-22/1954	3.0		1,580	6.8	54 2.69	33 2.71	169 7.35	17 0.43	0 0.00	124 2.03	236 5.95	232 6.54	1.5 0.02	0.4 0.02	1.2	24	911	49	270	168	
	4/16-17/1955	3.5		1,920	7.3	69 3.45	32 2.63	232 10.06	17 0.43	0 0.00	315 5.31	210 4.36	333 9.38	1.0 0.02		0.51	28	1,102	53	304	74	
Menlo Park Sanitary District	4/13/54	2.5		2,430	7.2	96 4.80	43 3.54	296 12.87	16 0.41	0 0.00	164 2.69	22 0.46	590 16.64	117 1.89	0.8 0.04	0.37	20	1,280	60	416	282	
	3/15/55	2.9		2,480	7.2	69 3.44	46 3.80	314 13.65	14 0.36	0 0.00	368 6.03	65 1.35	578 16.30	1.7 0.03		0.69	20	1,290	56	362	60	
City and County of San Francisco North Point Plant	4/20-21/1954	36.0		1,480	7.7	16 0.80	29 2.38	193 8.39	19 0.49	0 0.00	211 3.46	76 1.58	280 7.90	8.9 0.14	0.6 0.03	2.1	21	750	63	159	0	
City and County of San Francisco Southeast Plant	4/20-21/1954	12.5		3,950	7.4	61 3.04	81 6.66	610 26.53	36 0.92	0 0.00	70 1.15	224 4.66	1060 29.90	102 1.64	2.4 0.13	0.72	22	2,230	71	485	428	
CENTRAL COASTAL REGION[a]																						
Carmel Sanitary District	2/17/55	1.0		719	7.4	19 0.95	12 1.01	64 2.78	13 0.33	0 0.00	281 4.61	40 0.83	52 1.47	0.8 0.01		0.24	32	371	38	98	0	Grab sample
City of Monterey	2/17/55	1.4		976	7.4	35 1.75	13 1.05	102 4.44	14 0.36	0 0.00	343 5.62	28 0.58	124 3.50	0.9 0.01		0.74	31	517	45	140	0	
City of Pacific Grove	2/17/55			1,000	7.4	23 1.15	20 1.67	109 4.74	15 0.38	0 0.00	267 4.38	63 1.31	126 3.55	1.0 0.02		0.35	33	522	48	141	0	
City of Santa Barbara	8/30-31/1954	4.0		2,770	7.3	102 5.08	67 5.55	552 24.0	28 0.72		777 12.75	211 4.30	631 17.8	2.2 0.04	1.3 0.07	0.95		1,745	68			
City of Santa Cruz	2/10/55			950	7.5	58 2.89	13 1.11	102 4.44	11 0.28	0 0.00	339 5.56	59 1.23	100 2.82	1.6 0.03		0.48	36	548	44	200	0	
City of Watsonville	2/10/55	2.3		2,550	6.9	62 3.09	52 4.25	369 16.04	20 0.51	0 0.00	471 7.72	101 2.10	530 14.95	10 0.02		1.1	36	1,400	67	367	0	
LOS ANGELES REGION[b]																						
City of Los Angeles, Hyperion Plant	11/24/53	232.8			7.1	46 2.3	21 1.7	188 7.83	18 0.46			121 2.52	200 5.64		1.5 0.08	0.5		860	57	200		
	11/3/54	237.1			7.4	48 2.4	25 2.1	240 10.4	15 0.38			146 3.04	240 6.77		2.0 0.11	0.8		846	68	224		
	5/18/55	240.3			7.4	48 2.4	22 1.80	228 9.91	18 0.46			138 2.33	238 6.71		1.8 0.09	0.9		980	68	210		
	6/24-30/1955	242.5		1,540	7.9	53 2.67	25 2.06	215 9.36	16 0.40	0 0.00	198 3.24	156 3.24	238 6.71	86 1.39	1.1 0.06	1.09	20	942	65	287	74	7-day composite.

TABLE 4-Continued

MINERAL ANALYSIS
SEWAGE AND INDUSTRIAL WASTES

Discharging Agency	Date	Mean daily discharge mgd	Temp. °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million												Total dissolved solids ppm	Per cent sodium	Hardness as $CaCO_3$		Remarks
						Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)			Total ppm	N.C. ppm	
LOS ANGELES REGION (Cont'd).																						
City of Los Angeles Terminal Island Plant	11/24/53	4.8			7.2	67 / 3.4	50 / 4.1	600 / 26.1	35 / 0.90			163 / 3.40	906 / 25.6		1.5 / 0.08	2.3		2,320	71	376		
	11/3/54	6.0			7.0	86 / 4.3	76 / 6.24	860 / 37.4	35 / 0.90			179 / 3.73	1310 / 36.94		2.0 / 0.11	2.6		2,740	77	512		
	6/18/55	5.9			7.2	70.4 / 3.52	47 / 3.64	590 / 25.6	20 / 0.77			197 / 4.11	825 / 23.3		2.0 / 0.11	3.3		2,221	76	386		
	6/24-30/ 1955	6.3		4,100	7.4	64 / 3.19	64 / 5.29	648 / 28.20	33 / 0.85	0 / 0.00	105 / 1.72	235 / 4.90	1007 / 28.40	141 / 2.28	1.3 / 0.07	2.05	26	2,587	74	324	0	
City of Ventura	12/1/53	1.9			7.1	48 / 2.4	30 / 2.5	378 / 16.4	25 / 0.69			422 / 8.79	204 / 5.75		2.0 / 0.11	1.3		1,620	69	244		
	11/4/54	1.9			7.3	64 / 3.2	26 / 2.16	396 / 17.2	13 / 0.33			430 / 8.96	168 / 4.65		1.8 / 0.09	1.2		1,500	75	268		
	6/2/55	1.9			7.2	55 / 2.77	16 / 1.3	152 / 6.61	28 / 0.72			240 / 7.09	176 / 4.96		1.0 / 0.05	0.7		1,498	78	204		
Los Angeles County Sanitation Districts	11/24/53	152			7.3	118 / 5.90	28 / 3.0	550 / 23.9	25 / 0.64			280 / 5.84	292 / 22.3		3.5 / 0.18	2.5		2,400	68	450		
	11/3/54	168			7.0	102 / 5.10	45 / 3.72	600 / 26.1	22 / 0.56			255 / 5.31	858 / 24.2		4.0 / 0.21	2.3		2,310	73	440		
City of Oxnard	12/1/53	3.7			7.4	147 / 7.35	59 / 4.9	240 / 10.4	15 / 0.38			525 / 10.94	226 / 6.37		1.0 / 0.05	0.9		1,600	43	612		
	11/4/54	3.4			7.1	155 / 7.75	45 / 3.68	252 / 11.0	12 / 0.31			525 / 10.94	194 / 5.47		1.2 / 0.06	1.3		1,380				
	6/2/55	3.3			7.2	170 / 8.50	38 / 3.1	228 / 9.91	14 / 0.36			480 / 10.00	198 / 5.58		0.9 / 0.05	0.7		1,540	45	582		
Port Hueneme, United States Construction Battalion Center	11/4/54	1.2			7.3	148 / 7.40	54 / 4.44	530 / 23.0	11 / 0.28			745 / 15.53	396 / 11.17		1.2 / 0.06	1.7		2,130	66	593		
CENTRAL VALLEY REGION[a]																						
City of Antioch	3/26/54	0.8		1,530	7.2	37 / 1.35	42 / 3.45	154 / 6.7	15 / 0.38	0 / 0.00	378 / 6.19	192 / 4.0	148 / 4.17	0 / 0.00	1.4 / 0.07	0.67	29	852	45	265	0	
Fibreboard Products, Antioch Division	3/26/54	5.0		346	6.4	24 / 1.20	4.5 / 0.37	33 / 1.44	2.2 / 0.06	0 / 0.00	104 / 1.70	21 / 0.65	32 / 0.90	0.0 / 0.00	0.2 / 0.01	1.6	22	202	47	78	0	
Fibreboard Products, San Joaquin Division	3/26/54	15.0		1,170	7.7	69 / 3.44	6.9 / 0.57	164 / 7.13	5.8 / 0.15	0 / 0.00	176 / 2.88	94 / 1.96	212 / 5.98	0.0 / 0.00	0.9 / 0.05	1.8	13	654	63	200	56	
SANTA ANA REGION[b]																						
City of Newport Beach	4/14/54	2.56		9,009	7.7	120 / 5.99	189 / 15.5	1600 / 69.6	93 / 2.38	0 / 0.00	816 / 13.4	212 / 4.41	2820 / 79.5	0 / 0.00		1.02		5,615	73	1,075	0	
Orange County Joint Outfall Sewer	4/13-25/ 1954	13.6		3,300	7.2	82 / 4.09	28 / 2.38	530 / 25.23	26 / 0.67	0 / 0.00	351 / 5.76	203 / 4.23	730 / 22.00	86 / 1.39	1.2 / 0.06	302	30	1,979	78	324	36	

a - Analyses by Division of Water Resources.
b - Analyses by State Department of Public Health.

TABLE 4-Continued

MINERAL ANALYSIS
SEWAGE AND INDUSTRIAL WASTES

Agency	Date	Mean daily discharge mgd	Temp. °F	Specific conductance (micromhos at 25°C)	pH	Mineral constituents in parts per million / equivalents per million: Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Carbonate (CO_3)	Bicarbonate (HCO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Fluoride (F)	Boron (B)	Silica (SiO_2)	Total dissolved solids ppm	Per cent sodium	Hardness as $CaCO_3$: Total ppm	Hardness as $CaCO_3$: N.C. ppm	Remarks
SANTA ANA REGION (Cont'd).																						
Orange County Sanitation Districts: Plant No. 1	3/20-26/1955	13.0		1,579	7.3	66 / 3.29	21 / 1.73	226 / 9.83	17.6 / 0.45	0 / 0.00	388 / 6.36	278 / 5.80	192 / 5.41	0 / 0.00		0.58	25	1,010	65	251	0	7-day composite.
Plant No. 2	3/21-27/1955	7.68		5,747	7.2	101 / 5.04	66 / 5.43	1133 / 51.5	32.0 / 0.82	0 / 0.00	488 / 8.00	263 / 5.43	1800 / 50.8	0 / 0.00		3.48	30	3,745	81	528	123	7-day composite.
SAN DIEGO REGION[b]																						
International Outfall Sewer	4/11/55	3.76		1,980	7.2	75 / 3.74	32 / 2.63	200 / 8.70	19.2 / 0.49	0 / 0.00	449 / 7.3	100 / 2.08	346 / 9.76	0 / 0.00		0.34		995	56	318	0	Grab sample.
City of Chula Vista	2/19-25/1954	1.17		2,066	7.6	65 / 3.24	34 / 2.79	250 / 10.87	17.6 / 0.45	0 / 0.00	436 / 7.96	149 / 3.10	304 / 8.57	0.5 / 0.08		0.72		1,034	53	302	0	7-day composite.
	4/5-10/1955	1.36		2,000	7.0	81 / 4.04	48 / 3.29	256 / 11.14	18.8 / 0.48	0 / 0.00	434 / 7.12	243 / 5.07	346 / 9.76	0 / 0.00		1.04		1,200	58	356	10	6-day composite.
City of San Diego	4/14-15/1954	39.2		3,125	7.7	88 / 4.39	50 / 4.11	420 / 18.30	34 / 0.87	0 / 0.00	534 / 8.76	165 / 3.44	690 / 19.5	0 / 0.00		0.88		1,642	66	425	0	
	4/15-16/1954	39.2		3,040	7.5	76 / 3.79	55 / 4.52	420 / 18.30	34 / 0.87	0 / 0.00	520 / 8.52	161 / 3.36	665 / 18.70	0 / 0.00		0.72		1,613	66	416	0	
	4/16-17/1954	39.2		2,890	7.6	74 / 3.69	55 / 4.52	410 / 17.80	33 / 0.84	0 / 0.00	525 / 8.60	144 / 3.00	640 / 18.10	0 / 0.00		0.70		1,549	66	410	0	
	4/17-18/1954	39.2		2,762	7.5	70 / 3.49	52 / 4.27	380 / 16.50	32 / 0.82	0 / 0.00	444 / 7.28	189 / 3.93	570 / 16.10	0 / 0.00		0.62		1,466	66	388	24	
	4/18-19/1954	39.2		2,688	7.6	69 / 3.44	58 / 4.77	390 / 17.00	33 / 0.84	0 / 0.00	454 / 7.44	195 / 4.06	625 / 17.60	0 / 0.00		0.58		1,569	65	410	38	
	4/20-21/1954	39.2		2,801	7.4	70 / 3.49	56 / 4.60	410 / 17.80	33 / 0.84	0 / 0.00	459 / 7.57	204 / 4.25	605 / 17.10	0 / 0.00		0.76		1,590	66	404	28	
	4/21-22/1954	39.2		2,865	7.5	74 / 3.69	57 / 4.69	440 / 19.10	35 / 0.90	0 / 0.00	561 / 9.20	145 / 3.03	675 / 19.00	0 / 0.00		0.90		1,632	67	419	0	
	4/2-8/55	38.5		2,950	7.1	119 / 5.94	35 / 2.88	450 / 19.58	21.2 / 0.54	0 / 0.00	344 / 5.64	347 / 7.23	635 / 17.91	0 / 0.00		1.06		1,785	68	441	159	7-day composite.
City of Laguna Beach	4/14/54	0.77		1,645	7.2	40 / 2.00	27 / 2.22	250 / 10.88	20 / 0.62	0 / 0.00	200 / 3.28	311 / 6.47	185 / 5.22	64 / 1.04		0.54		1,015	70	211	47	
	4/5-10/55	0.81		1,670	7.3	40 / 2.00	23 / 1.89	248 / 10.79	16.8 / 0.43	0 / 0.00	220 / 3.60	338 / 7.05	190 / 5.36	52 / 0.36		0.42		1,025	68	194	14	6-day composite.
City of Oceanside	4/15/54	1.23		2,137	7.4	107 / 5.34	42 / 3.45	230 / 10.00	22 / 0.56	0 / 0.00	554 / 9.08	155 / 3.23	350 / 9.87	0 / 0.00		0.60		1,153	52	440	0	
	4/4-10/55	1.48		2,326	7.2	116 / 5.79	41 / 3.37	248 / 10.79	17 / 0.44	0 / 0.00	425 / 6.96	287 / 5.97	360 / 10.15	0 / 0.00		0.66		1,315	53	458	110	7-day composite.

b - Analyses by State Department of Public Health.

TABLE 5

SANITARY ANALYSES
SEWAGE AND INDUSTRIAL WASTES

DISCHARGING AGENCY	DATE SAMPLED	HOURS COMPOSITED	MEAN DISCHARGE mgd	SUSPENDED SOLIDS ppm	BIOCHEMICAL OXYGEN DEMAND 5-DAY, 20°C ppm	ETHER SOLUBLE MATERIAL ppm	COLIFORM MPN/100ml	OTHER CONSTITUENTS ppm	REMARKS
SAN FRANCISCO BAY REGION									
City of Mill Valley	4/22/54	8		113	159			Total Solids, 1,250	
Marin County Sanitation Districts No. 1 and 2	9/25/52	15		20	25	5.5		Total Solids, 6,185	
San Rafael Sanitation District	4/30/54	8	2.2	96	105	18		Total Solids, 1,858	
Sausalito-Marin City Sanitary District	4/28/54	8	0.6	76	92	3.4		Total Solids, 1,874	
Vallejo Sanitation and Flood Control District North Outfall	4/23/54	8	1.7	198	304	39		Total Solids, 1,596	Raw Sewage
South Outfall	4/23/54	8	1.5	200	263	56		Total Solids, 1,382	Raw Sewage
City of Benicia	4/26/54	7	1.3	261	357	83		Total Solids, 1,406	Raw Sewage
Cities of Fairfield and Suisun	4/29/54	8	0.8	107	210	63		Total Solids, 968	Raw Sewage
City of Concord	9/25/52	15		75	130	12		Total Solids, 1,190	
	3/25/54	8	1.4	40	24	25		Total Solids, 1,084	
City of Martinez	4/2/54	8	0.9	151	299	71		Total Solids, 1,068	Raw Sewage
City of Pittsburg	3/18/19/1954	24	1.0	80	123	52		Total Solids, 1,286	
City of Richmond Castro Street	3/31/54	8	1.3	77	1400	77		Total Solids, 13,520	Raw Sewage
South 10th Street	3/31/54	8	0.25	150	209	51		Total Solids, 1,218	Raw Sewage
Central Contra Costa Sanitary District	9/25/52	15		80	23			Total Solids, 1,060	
	3/24/54	12	2.7	18	27	56		Total Solids, 676	
Columbia-Geneva Steel, Pittsburg Cooling Water Discharge	3/17/54	24	10.5	42	28	---		- - - - - -	
Oil Waste	3/17/54	24	5.5	62	10.5	---		- - - - - -	
Mill Scale Waste	3/17/54	24	2.0	80	5.7	7.4		- - - - - -	
Johns-Manville Corporation, Pittsburg	3/19/54	8	1.8	206	169	48.8		- - - - - -	
Pioneer Rubber Mills, Pittsburg	3/18/54	8	1.7	32	3	1.6		- - - - - -	
General Chemical Corporation, Nichols	3/28/54	24	4.3	80	No reaction	2.2		- - - - - -	
Shell Chemical Company, Pittsburg	3/25/54	8	1.6	4	44	---		- - - - - -	
C and H Sugar Refinery Crockett	5/9/54	24	1.5	58	717	---		- - - - - -	
City of San Leandro	9/20/52	15		100	390	26		Total Solids, 955	
	5/11-12/1954	24	3.9	100	179	22		Total Solids, 836	

TABLE 5-Continued

SANITARY ANALYSES
SEWAGE AND INDUSTRIAL WASTES

[illegible]	DATE SAMPLED	HOURS COMPOSITED	MEAN DISCHARGE mgd	SUSPENDED SOLIDS ppm	BIOCHEMICAL OXYGEN DEMAND 5-DAY, 20°C ppm	ETHER SOLUBLE MATERIAL ppm	COLIFORM MPN/100ml	OTHER CONSTITUENTS ppm	REMARKS
San Francisco Bay Region (Continued)									
East Bay Municipal Utility District Special District No. 1	5/11/12/ 1954	24	60	130	244	40		Total Solids, 1,218	
Hayward Sanitary District	5/3/54	8	2.4	43	14	2.3			
Oro Loma Sanitary District	9/24/52	15		95	160	27		Total Solids, 780	
	5/4/54	8	5.9	120	96	32			
	5/28/54			133	114	27			
Union Sanitary District	4/12/13/ 1954	24	1.1	92	116	25		Total Solids, 978	
City of Mountain View	4/14/54	8	0.85	60	112	9		Total Solids, 2,532	
City of Palo Alto	9/24/52			80	90	17		Total Solids, 950	
	4/12/13/ 1954	24	4.6	99	129	25		Total Solids, 1,252	
City of San Jose	9/22/23/ 1952	24		360	700	39		Total Solids, 1,540	Raw Sewage
	9/23/24 1954	24		325	920	42		Total Solids, 1,750	Raw Sewage
	4/6/7/ 1954	24	21.7	317	1144	54		Total Solids, 2,450	Raw Sewage
	4/7/8/54	24	24.6	316	1110	65		Total Solids, 2,730	Raw Sewage
City of Sunnyvale	9/24/52	16		325	1090	33		Total Solids, 1,600	Raw Sewage
	4/8/54	15	1.0	191	251	21		Total Solids, 898	
	4/14/54	8	1.55	178	254	32		Total Solids, 864	
City of Burlingame	9/24/52	15		95	200	40		Total Solids, 545	
	4/19/54	8	1.4	117	216	62		Total Solids, 734	
	4/19/54	16	1.4	113	197			Total Solids, 740	
City of Millbrae	4 20/54	8	0.5	120	190	19		Total Solids, 708	
City of Redwood City	9/24/52	15		110	390	28		Total Solids, 1,810	
	4/13/14/ 1954	24	2.9	100	199	39		Total Solids, 1,296	
City of San Mateo	9/24/52	15		145	180	15		Total Solids, 1,695	
Cities of South San Francisco and San Bruno	9/24/52	15		135	140	13		Total Solids, 2,440	
	4/21/22/ 1954	24	3.0	235	111	9		Total Solids, 1,140	
Menlo Park Sanitary District	4/13/54	16	2.5	81	131	21		Total Solids, 1,528	

TABLE 5-Continued

SANITARY ANALYSES
SEWAGE AND INDUSTRIAL WASTES

DISCHARGING AGENCY	DATE SAMPLED	HOURS COMPOSITED	MEAN DISCHARGE mgd	SUSPENDED SOLIDS ppm	BIOCHEMICAL OXYGEN DEMAND 5-DAY, 20°C ppm	ETHER SOLUBLE MATERIAL ppm	COLIFORM MPN/100ml	OTHER CONSTITUENTS ppm	REMARKS
San Francisco Bay Region (Continued)									
San Carlos-Belmont Sanitary District	9/24/52	15		95	230	26		Total Solids, 1,410	
	4/20/54	8	1.7	112	194	46		Total Solids, 622	
City and County of San Francisco North Point Plant	4/20/54	24	36.0	113	252			Total Solids, 990	
Southeast Plant	4/20/54	24	12.5	135	155			Total Solids, 2,620	
CENTRAL COASTAL REGION									
City of Salinas,	9/18/52	16		10.5	17	2.6			
City of Santa Cruz	9/18/52	16		180	550	12			
City of Watsonville,	9/18/52	16		225	190	12			
LOS ANGELES REGION									
City of Los Angeles Hyperion Plant	11/24/53	24	232.8	38	65	4.4	7,000,000		
	11/3/54	24	237.1	44	60	8	24,000,000		
	5/18/55	24	240.3	74	65	9	70,000,000		
Terminal Island Plant	11/24/53	24	4.9	92	205	11	70,000,000		
	11/3/54	16	6.0	142	245	9	70,000,000		
	5/18/55	16	5.9	175	170	40	70,000,000		
	6/21/55	15	6.3	9-53		2 - 8			Range for 7-day period.
City of Ventura	12/1/53	16	1.8	170	315	18	240,000,000		
	11.4/54	14	1.9	129	230	10	240,000,000		
	6/2/55	16	1.9	125	315	11	7,000,000		
Los Angeles County Sanitation Districts	11/24/53	24	151.6	170	220	8	240,000,000		
	11/3/54	24	162.8	210	240	13	62,000,000		
	5/18/55	24	157.4	247	235	50	700,000,000		
CENTRAL VALLEY REGION									
City of Antioch Sewage Treatment Plant	3/26/54	8	0.8	114	142	92.1			
Fibreboard Products, Antioch Division	3/26/54	8	5.0	294	138				
Fibreboard Products, San Joaquin Division	3/26/54	8	15.0	770					
SANTA ANA REGION*									
Orange County Sanitation Districts Plant No. 1	July, 1954			118	251	49			Grab Sample
	August, 1954			116	235	41			Grab Sample

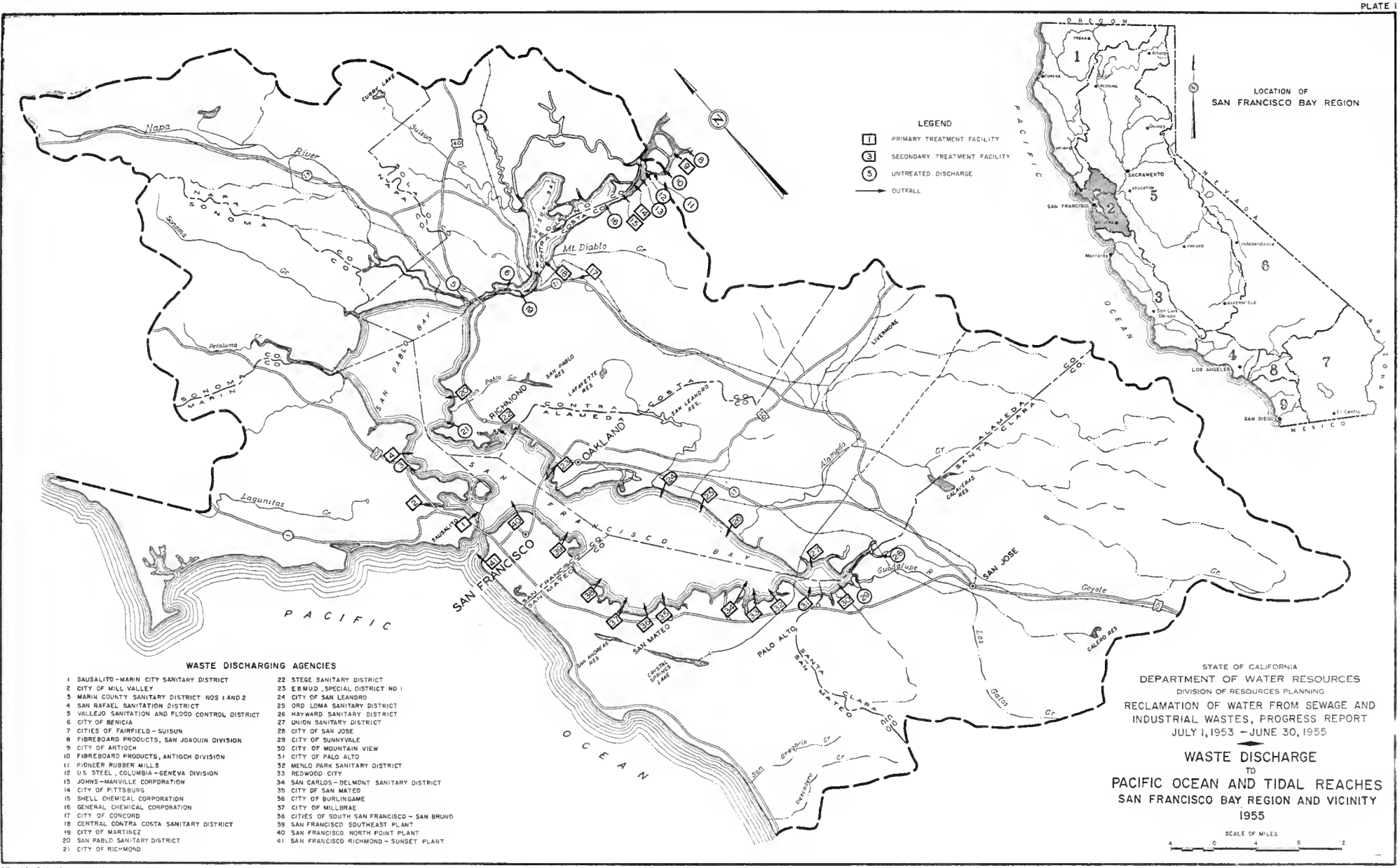
* Analyses by Orange County Sanitation Districts.

TABLE 5-Continued

SANITARY ANALYSES
SEWAGE AND INDUSTRIAL WASTES

DISCHARGING AGENCY	DATE SAMPLED	HOURS COMPOSITED	MEAN DISCHARGE mgd	SUSPENDED SOLIDS ppm	BIOCHEMICAL OXYGEN DEMAND 5-DAY, 20°C ppm	ETHER SOLUBLE MATERIAL ppm	COLIFORM MPN/100ml	OTHER CONSTITUENTS ppm	REMARKS
Santa Ana Region (Continued)									
Orange County Sanitation Districts									
Plant No. 1	September 1954			116	218	42			Grab Sample
	October, 1954			105	215	35			Grab Sample
	November, 1954			103	198	33			Grab Sample
	December 1954			110	203	41			Grab Sample
Plant No. 2	August, 1954			81	234	37			Grab Sample
	September 1954			105	202	29			Grab Sample
	October 1954			75	178	24			Grab Sample
	November 1954			89	148	28			Grab Sample
	December 1954			94	136	42			Grab Sample

PLATE I



WASTE DISCHARGING AGENCIES

1 SAUSALITO-MARIN CITY SANITARY DISTRICT
2 CITY OF MILL VALLEY
3 MARIN COUNTY SANITARY DISTRICT NOS 1 AND 2
4 SAN RAFAEL SANITATION DISTRICT
5 VALLEJO SANITATION AND FLOOD CONTROL DISTRICT
6 CITY OF BENICIA
7 CITIES OF FAIRFIELD-SUISUN
8 FIBREBOARD PRODUCTS, SAN JOAQUIN DIVISION
9 CITY OF ANTIOCH
10 FIBREBOARD PRODUCTS, ANTIOCH DIVISION
11 PIONEER RUBBER MILLS
12 U.S. STEEL, COLUMBIA-GENEVA DIVISION
13 JOHNS-MANVILLE CORPORATION
14 CITY OF PITTSBURG
15 SHELL CHEMICAL CORPORATION
16 GENERAL CHEMICAL CORPORATION
17 CITY OF CONCORD
18 CENTRAL CONTRA COSTA SANITARY DISTRICT
19 CITY OF MARTINEZ
20 SAN PABLO SANITARY DISTRICT
21 CITY OF RICHMOND
22 STEGE SANITARY DISTRICT
23 EBMUD, SPECIAL DISTRICT NO 1
24 CITY OF SAN LEANDRO
25 ORO LOMA SANITARY DISTRICT
26 HAYWARD SANITARY DISTRICT
27 UNION SANITARY DISTRICT
28 CITY OF SAN JOSE
29 CITY OF SUNNYVALE
30 CITY OF MOUNTAIN VIEW
31 CITY OF PALO ALTO
32 MENLO PARK SANITARY DISTRICT
33 REDWOOD CITY
34 SAN CARLOS-BELMONT SANITARY DISTRICT
35 CITY OF SAN MATEO
36 CITY OF BURLINGAME
37 CITY OF MILLBRAE
38 CITIES OF SOUTH SAN FRANCISCO - SAN BRUNO
39 SAN FRANCISCO SOUTHEAST PLANT
40 SAN FRANCISCO NORTH POINT PLANT
41 SAN FRANCISCO RICHMOND-SUNSET PLANT

STATE OF CALIFORNIA
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES, PROGRESS REPORT
JULY 1, 1953 - JUNE 30, 1955

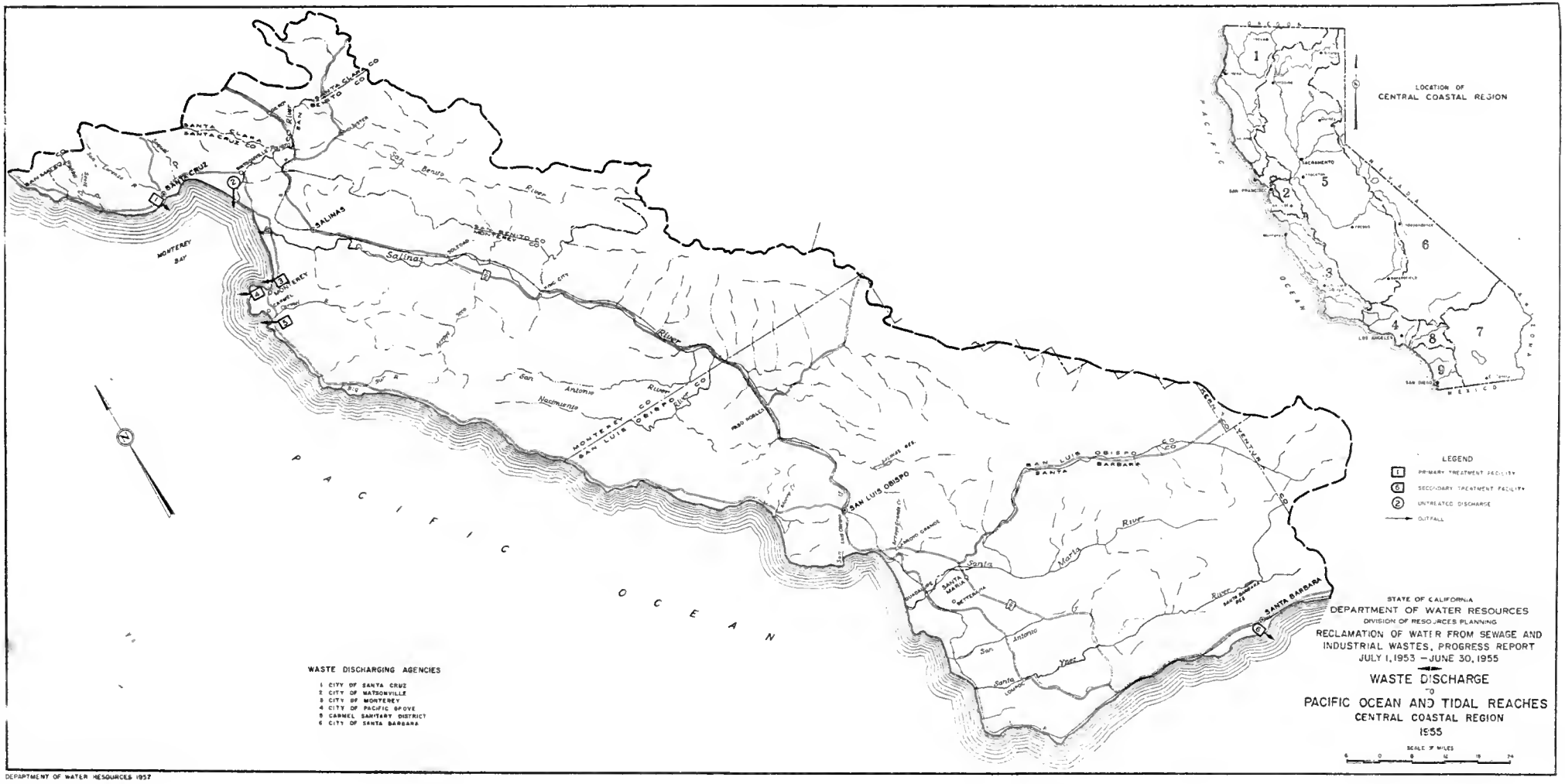
WASTE DISCHARGE TO PACIFIC OCEAN AND TIDAL REACHES

SAN FRANCISCO BAY REGION AND VICINITY
1955

SCALE OF MILES
4 0 4 8 12

DEPARTMENT OF WATER RESOURCES 1957

PLATE 2



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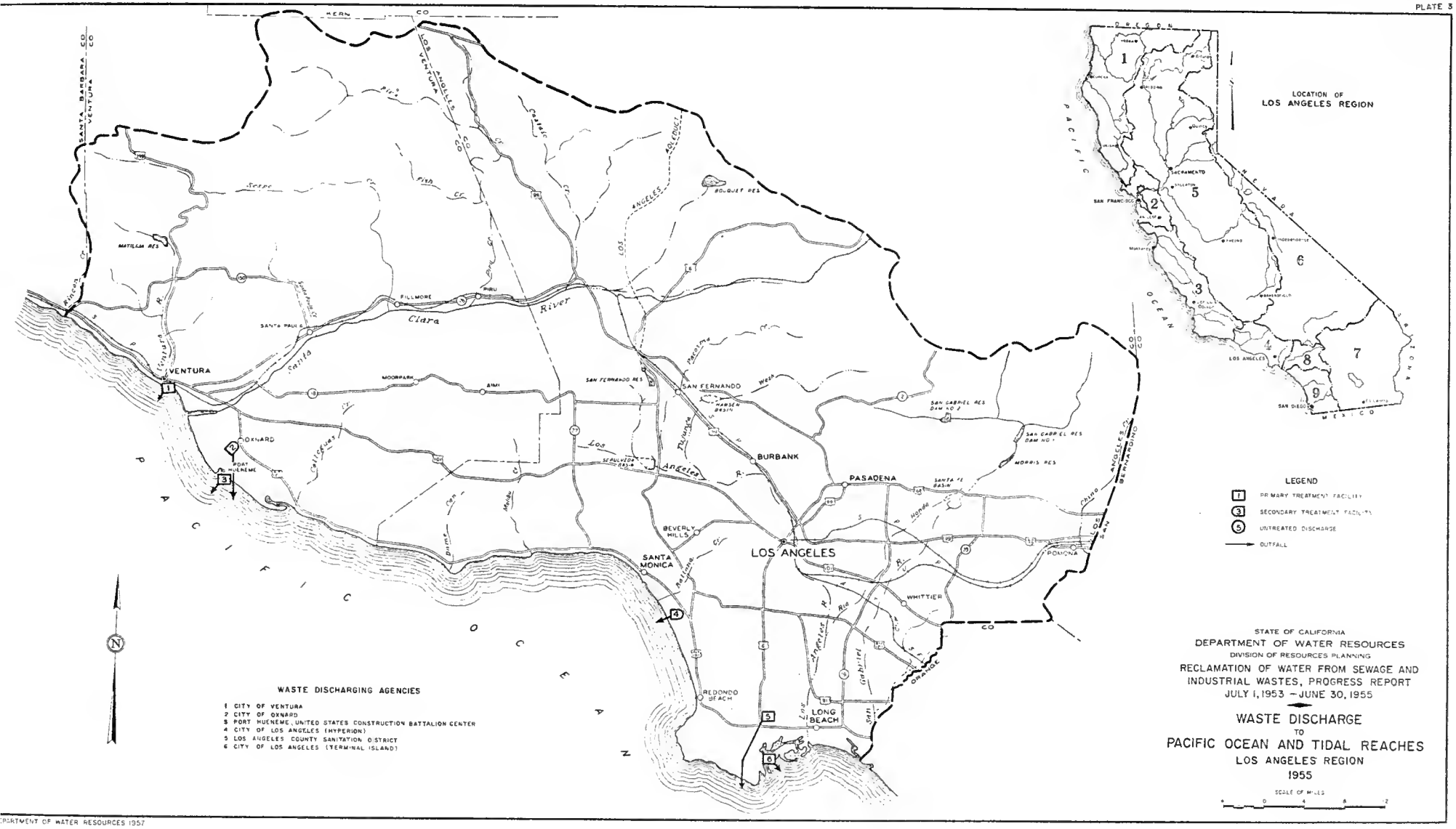
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES, PROGRESS REPORT
JULY 1, 1953 – JUNE 30, 1955

WASTE DISCHARGE TO PACIFIC OCEAN AND TIDAL REACHES CENTRAL COASTAL REGION 1955

SCALE IN MILES

DEPARTMENT OF WATER RESOURCES 1957



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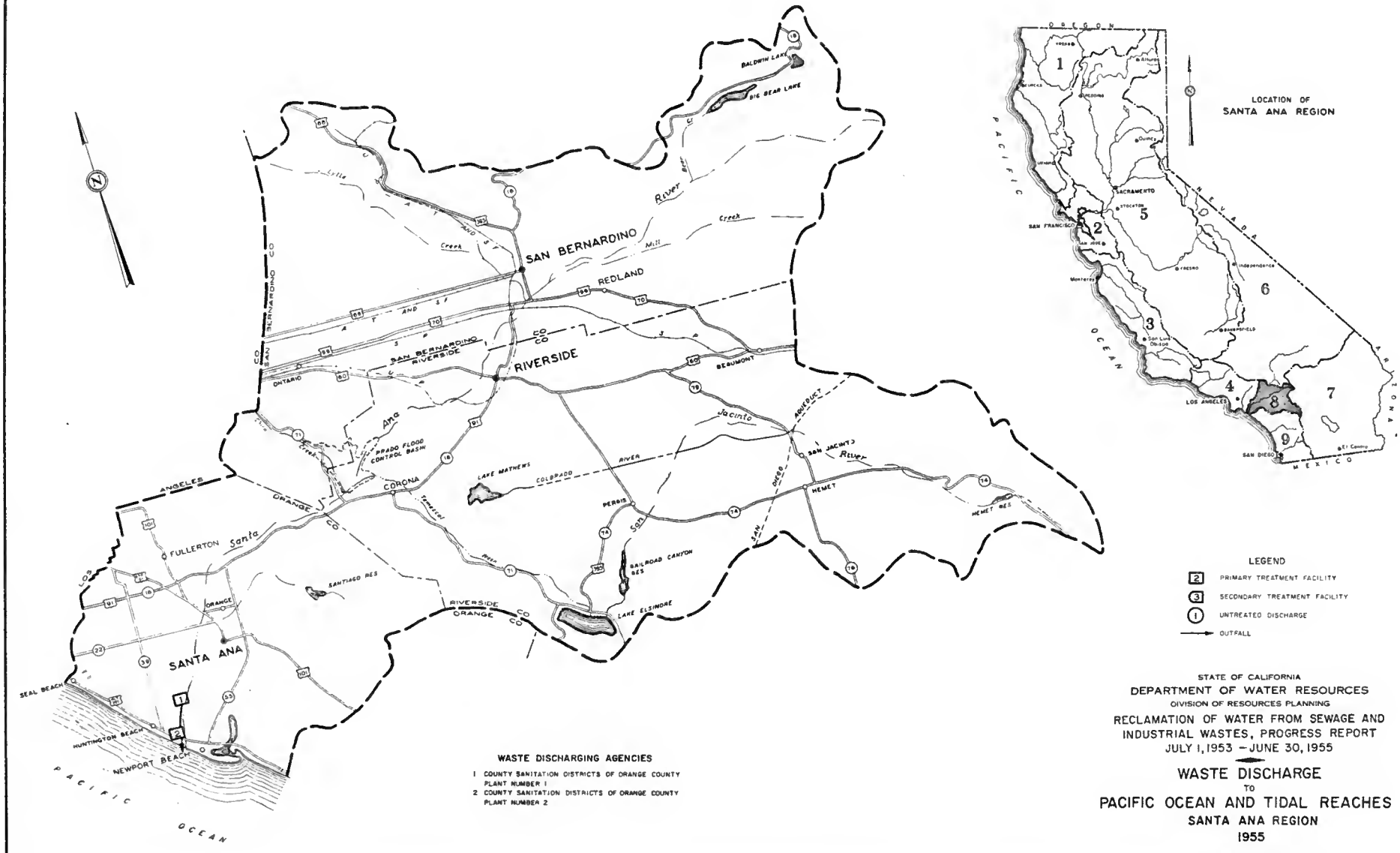
DEPARTMENT OF WATER RESOURCES
DIVISION OF RESOURCES PLANNING

RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES, PROGRESS REPORT
JULY 1, 1953 – JUNE 30, 1955

WASTE DISCHARGE TO PACIFIC OCEAN AND TIDAL REACHES LOS ANGELES REGION 1955

DEPARTMENT OF WATER RESOURCES 1957



LEGEND

- 2 PRIMARY TREATMENT FACILITY
- 3 SECONDARY TREATMENT FACILITY
- (1) UNTREATED DISCHARGE
- OUTFALL

STATE OF CALIFORNIA
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DIVISION OF RESOURCES PLANNING

RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES, PROGRESS REPORT
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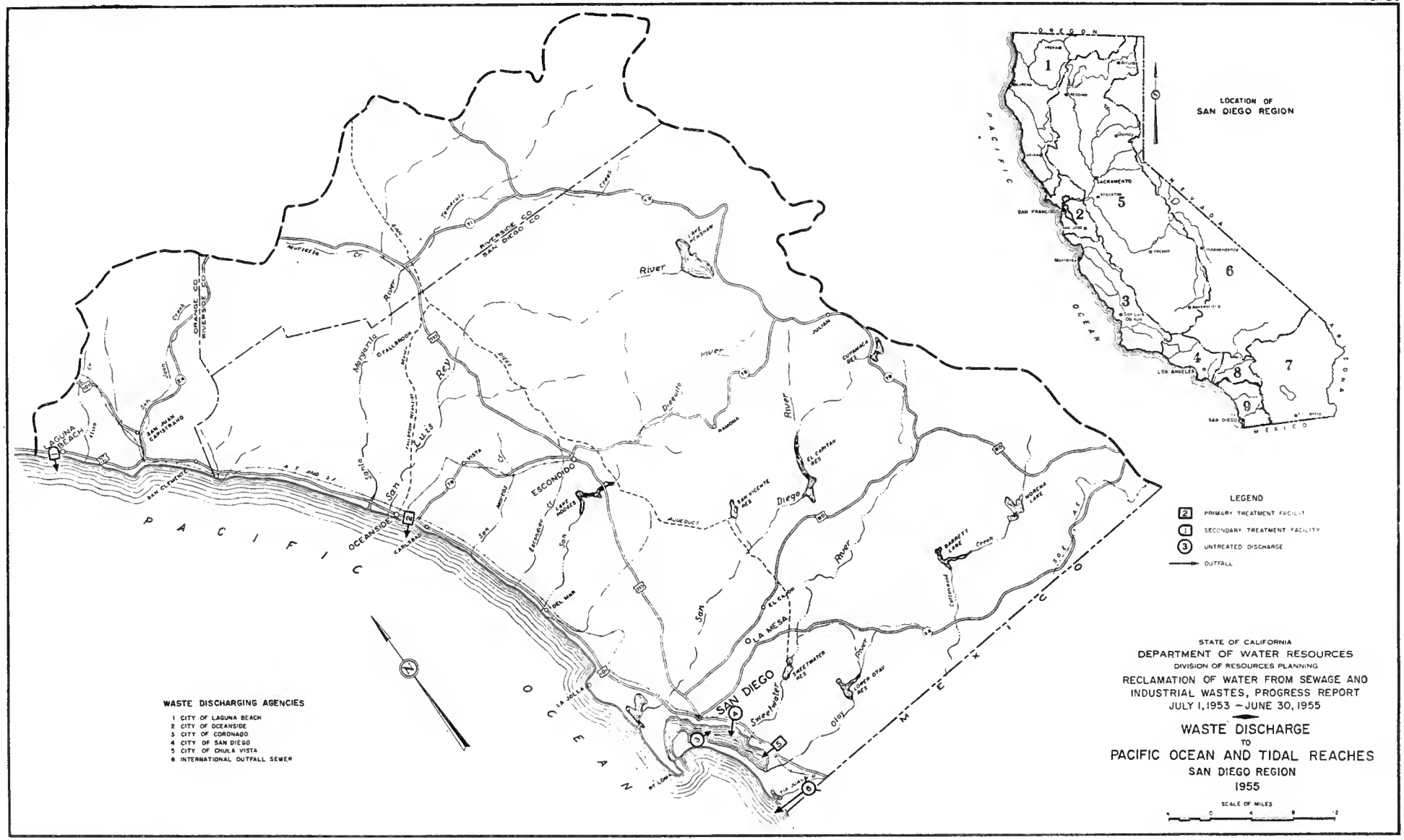
WASTE DISCHARGE TO PACIFIC OCEAN AND TIDAL REACHES

SANTA ANA REGION
1955

SCALE OF MILES
4 0 4 8 12

DEPARTMENT OF WATER RESOURCES 1957

PLATE 5



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RECLAMATION OF WATER FROM SEWAGE AND INDUSTRIAL WASTES, PROGRESS REPORT
JULY 1, 1953 – JUNE 30, 1955

WASTE DISCHARGE TO PACIFIC OCEAN AND TIDAL REACHES

SAN DIEGO REGION
1955

SCALE OF MILES
4 0 4 8 12

DEPARTMENT OF WATER RESOURCES 1957